NOVEMBER 23, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

We'll Boost Capacity . . .

Modernize Our Plants . . .

Market More Vigorously

A revitalization of the copper industry is underway, say Anaconda's Weed (top), Phelp Dodge's Page (center), and Asarco's MacKenzie. But first the strike must be settled. Copper supplies will be tight for at least three months after agreement is reached—Page 37

USW Shifts Sights to Nonsteel Cases

Why the Consumer Is Ready for A Record Spending Spree

Must Your Heirs Sell the Firm?

Put the Squeeze on Machining Costs By Settling for Shorter Tool Life

Du Pont Reports on Explosive Forming

Steel Operations Zoom—You'll Get Deliveries Quicker than Expected

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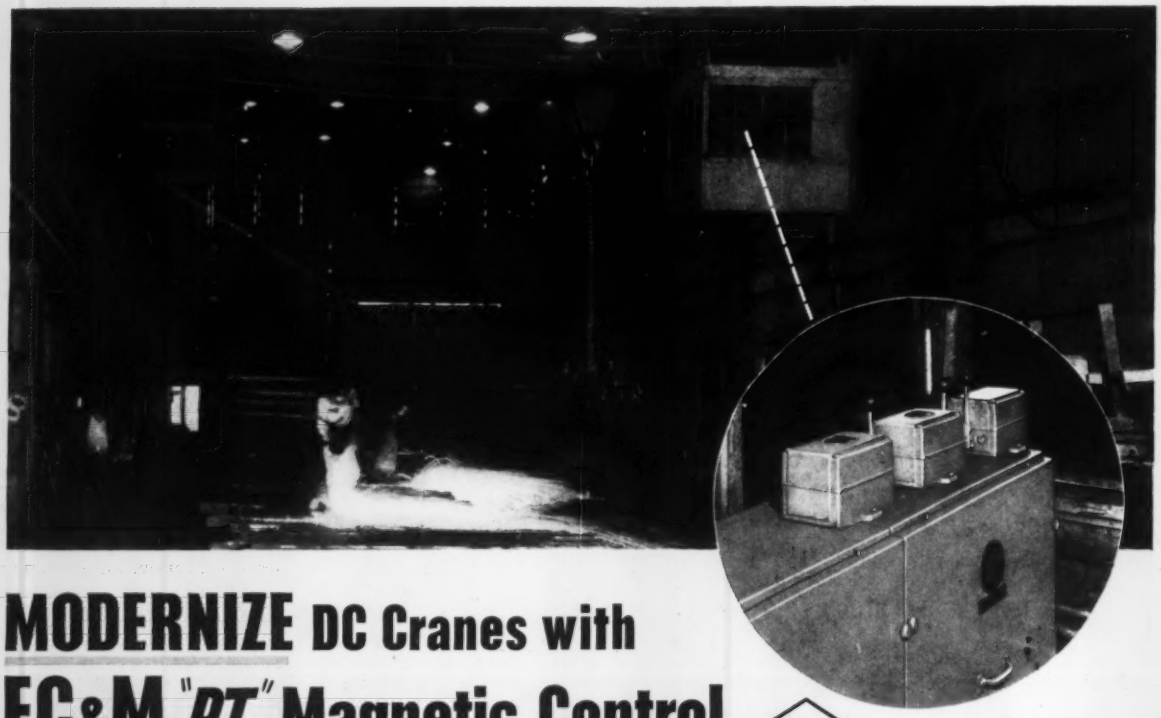
METALWORKING OUTLOOK
PAGE 29



MODERNIZE DC Cranes with EC&M "PT" Magnetic Control

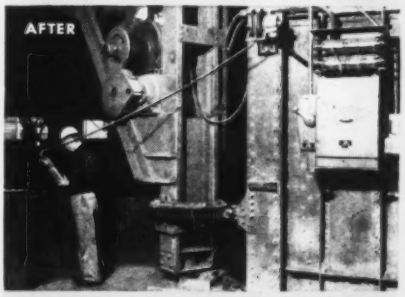
Three-motion crane serving scarfing area in mid-western steel plant uses "PT" control for bridge, trolley and hoist motions. EC&M Tab-Weld resistors are mounted on bridge foot-walk. Two "PT" controllers, replacing manual controllers, are mounted at front of cab. Third controller is at rear of cab, and all three master switches are up front within easy reach of operator. Since converting to "PT" control, there is more room in cab.

Is *manual* control penalizing crane operation in your plant? Are motors and machine subjected to abnormal conditions during acceleration and plugging? Is output affected by the slower reaction of operators as they tire under the strain of manual control on an all-day's run?

EC&M "PT" Magnetic Control erases these deficiencies. Timed acceleration and rectifier-plugging protection cuts motor abuse. Compact, easy-operating master switches provide a new "feel", enabling the operator to increase output.

The illustrations shown here are typical of the acceptance of EC&M "PT" control for DC Cranes. One plant has a modernization program under way involving dozens of cranes. Physically, "PT" control occupies about the same space as manual control. The cost is comparable, too.

Convert now to "PT" control. This *magnetic* control is far superior to manual control.



Jib crane, shown at top with old manual controller, is now operated by "PT" magnetic control (bottom). Pendant pushbutton provides remote control, gives operator better view of open hearth floor. "PT" control can be operated, without change, by either master switches or pendant pushbutton. "PT" control is front wired, front accessible, for mounting against walls or crane girders.

Write for complete details on "PT" crane control. Ask for Bulletin 6131.

2950

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This Week in STEEL

The Metalworking Weekly

November 23, 1959 Vol. 145—No. 21

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Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED NOV. 14	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	134†	111	119	152

†Preliminary.

STEEL's industrial production index took the first step back to prestrike levels during the latest period. The only component that failed to respond was auto production. Another big jump is in store for the week ended Nov. 21.

Details on Page 59

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED NOV. 21	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	60,000*	64,668†	112,488	138,727

(Source: Ward's Automotive Reports.) *Estimated. †Preliminary.

Auto production will continue to suffer because of steel shortages for another couple of weeks. Even American Motors Corp., one of best stocked carmakers, has had to adjust schedules a bit to stretch out supplies.

Details on Page 56

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED NOV. 22	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,237*	1,291	371	2,000
Index (1947-49=100)	139.3*	80.4	23.1	124.5
Percentage of capacity	79.0*	45.6	13.1	74.1

*Estimated by STEEL; comparative figures reported by AISI.

Speedup of steelmaking operations is rapid. In the second week following reopening of mills, production is greater than in any week in the period from June, 1957, through January, 1959. Rise to 90 per cent or more by early next month is expected.

Details on Page 114

STEEL SCRAP PRICE COMPOSITE

	NOV. 18	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$44.83	$45.33	$44.33	$40.67

The slight setback recorded in the No. 1 heavy melting scrap price composite last week reflects a temporary situation. Consensus among traders is that the market will resume its upward climb to the highest levels since September, 1957.

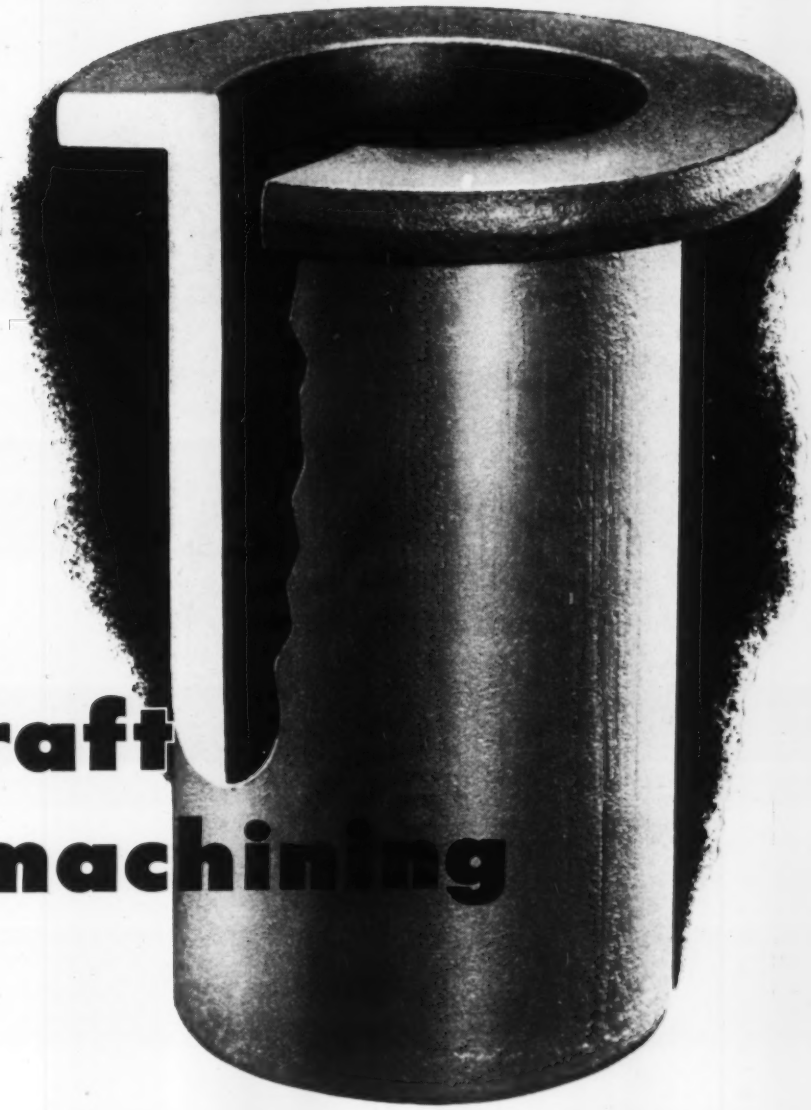
Details on Page 127

FINISHED STEEL PRICE INDEX

	NOV. 17	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	186.9

Steel consumers' concern for deliveries overshadows any interest they may have in price schedules. Producers are concentrating on getting out the desired tonnages and will await developments before considering price action.

Details on Page 115



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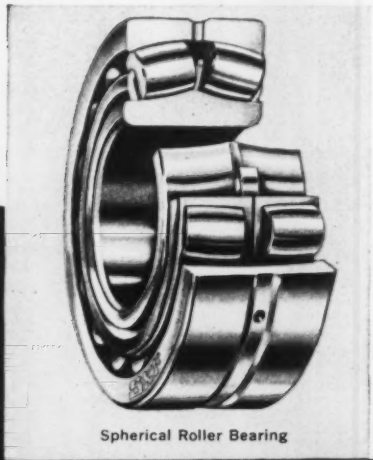
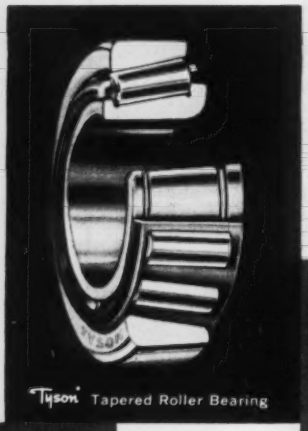
BETHLEHEM STEEL

BETHLEHEM STEEL

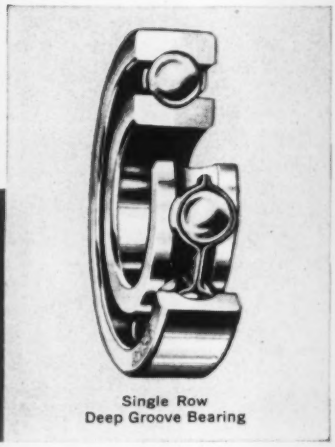


Spherical Roller Bearing

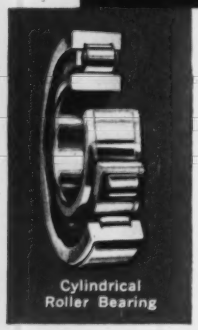


Tyson Tapered Roller Bearing

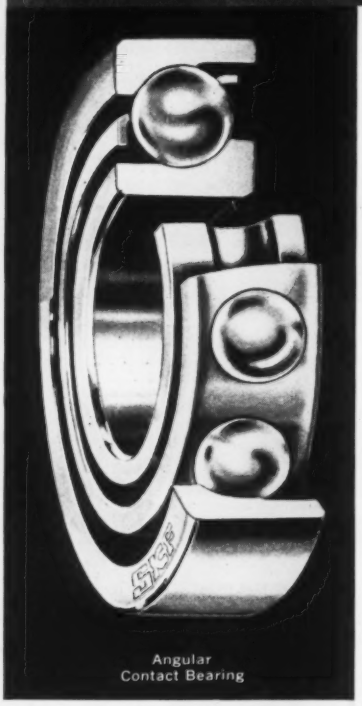
Spherical Roller Thrust Bearing



Single Row
Deep Groove Bearing



Cylindrical
Roller Bearing



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When can a standard bearing do a "special" job?

Suppose you need a high speed bearing to support either heavy thrust load or thrust load combined with radial load. It is almost a certainty that SKF angular contact ball bearings will do the job.

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Automatic control, the vital element which helps make automation and its many important production benefits possible, involves much more than top quality control equipment. And for most effective automation, automatic control begins long before the start-up—should in fact be the starting point for automation planning.

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That's why today, more and more automation-minded manufacturers everywhere are turning to Clark Controller for completely coordinated control engineering service and equipment.

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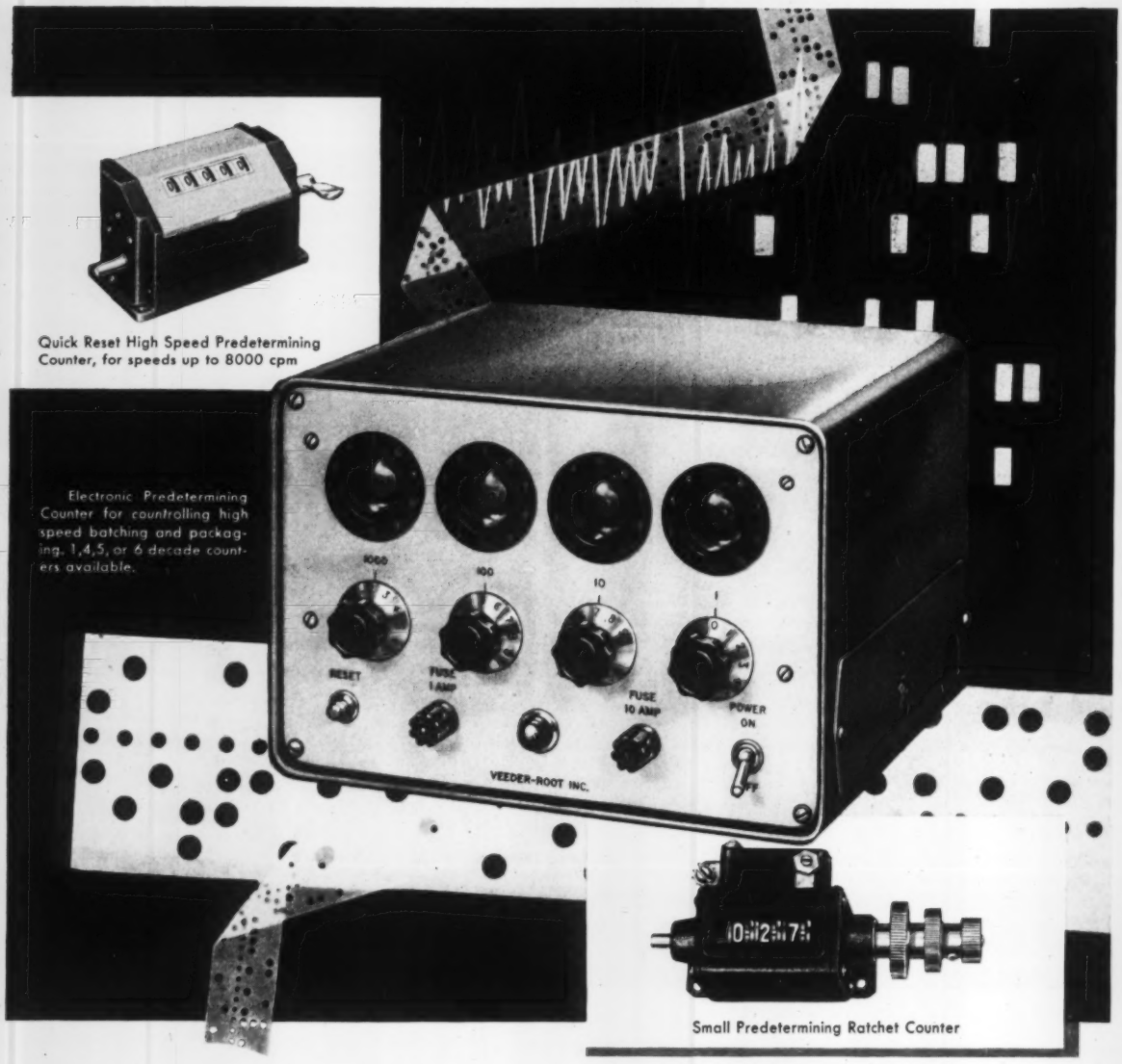

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Veeder-Root's extensive line of predetermining counters provides this simplified automation easily and at low cost. Attachment to machines and other devices is quick and easy, or a Veeder-Root Counting Engineer can provide application assistance.

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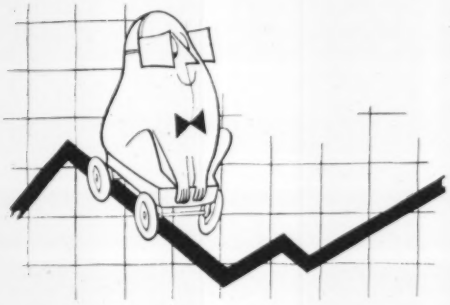

What's Ahead?

Here's another character from the American Management Association's book, *The Embattled Executive.* The caption reads:

"Trend Rider. Sales last year just paralleled the sales of rum cokes in Rio, as modified by the sum of the last digits of all new telephone numbers in Toronto. This figure remains the same, so why change sales quotas?"

STEEL readers don't resemble the guy in the freewheeling wagon, but check the item on . . .

How to Make a Prediction

We crawled out of our office (a garret behind the smokestack) and showed the cartoon to Market Editor Bill Rooney. The glib approach prompted a grin. Next week, Bill will tell you what ingot steel production will be this year, and he'll outline next year's prospects.

His methods? He checks with steel producers and marketers, evaluates inventory levels, tallies industry capacity and expansion plans—but he won't tell us how he does the rest.

Bill packs 42 years of experience in editing metalworking market data—all with Penton Publishing. We trust his judgment by now.

An Editor in a Dither

In the Oct. 26 Servicenter we mentioned that Detroit Editor Don Postma was buying one of the new compact cars. Right off the bat he got a telegram from Harry N. Malone, Alcoa Public Relations Dept., Pittsburgh:

"SIGHT UNSEEN, I'LL BET YOU A LUNCH IT'S A RAMBLER, RE STATEMENT IN YOUR FAVORITE MAGAZINE."

On the heels of that guess, Don received this note from Clifford D. Merriott, public relations director, Cadillac Div., General Motors:

"I choose to think this is a reflection by the editors on the company pay scale . . . or is it?"

Don says he hasn't answered either communique, and we don't intend to. Such items might have triggered the following incident.

We Must be Vigilant Dept.

In a memo to Associate Managing Editor John Morgan, Don Postma wrote: "In the Nov. 2 Mirrors of Motordom, we stated that Alcoa estimates the auto industry will use 55.1 million lb of aluminum this year . . . What should have been said was: The auto industry will use 55.1 million lb for trim only this year. As any damn fool knows, the industry will be using close to 300 million lb of auminum in 1959 and probably 360 million to 390 million lb in 1960. I'm chagrined!"

Keys to Two Weeks of Fun . . .

. . . Can be yours if you Beat-the-Experts at predicting the number of U. S. passenger cars that will be built in the first six months of 1960. Any one of the 19 cars produced by Ford Div. of Ford Motor Co. (from the Falcon through the Thunderbird) will be yours to use for two weeks. Five runners-up will receive handsome color prints of a dream car designed and rendered for the contest by Virgil Exner, Chrysler Corp. vice president and director of styling.

It's easy to enter. Just clip the coupon from this department, make your estimate, and mail in the completed blank. Full details about the contest are in the Servicenter of Nov. 16 (p. 5).

Quick Action

Sailors marveled at the skill of the sea captain. Besides his compass (the only navigational support he appeared to have), he consulted "something" in his sea chest every morning.

When the old salt died, the sailors opened the chest. The secret "something" turned out to be a

I believe _____ automobiles will be produced in the U. S. from Jan. 1 through June 30, 1960.

Mail this to:
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59-41

sheet of paper with this sentence: Starboard is right, and port is left.

In a similar vein, we often marvel at the power of the press and of editors.

Take this example: On Sept. 28, p. 93, our reporters made this observation on Great Lakes port development for the St. Lawrence Seaway: "The outlook for Detroit is not good. Squabbling between public and private factions on what and how to expand seems to doom any immediate remedy for Detroit's inadequate dock space."

Ralph T. McElvenny, chairman, Mayor's Waterfront Development Committee in Detroit, tells us: "You'll be interested to know that Mayor Miriani has announced plans for an $8 million expansion of Detroit's private port facilities."

When did that action come?

On Sept. 29, of course.

Tooling Up for Calls

Ivan E. Peterson, West Coast sales manager, Metals Div., Kelsey-Hayes Co., Los Angeles, wrote to us for 50 copies of the 1959 Metal Selector. He noted: "I wish to compliment you on this most useful tool. It will be particularly valuable in calls on purchasing and engineering groups."

When Would You Like to Retire?

About 30 per cent of industry's executives would like to retire between the ages of 58 and 62, reveals a study of 15,000 businessmen by the *Harvard Business Review* and The Twentieth Century Fund.

Here's the tabulation: 2 per cent would like to retire before they reach 48; 5.5 per cent between 48 and 52; 14.2 per cent between 53 and 57; 20.9 per cent between 63 and 67; 9.8 per cent between 68 and 72; and 5.9 per cent (high octane types) would like to hit the hammock after 72. The remainder, 11.8 per cent, declined to answer—possibly perpetual motion types.

They're on the Way

"I would greatly appreciate reprints of the four articles in your series on the Manpower Shortage," writes David C. Cheney, Marquette Mfg. Co. Inc., Minneapolis.

"In reading the first articles it becomes apparent a good deal of time and clear thinking have gone into preparing this series on an increasingly difficult area of personnel relations."

59-28

IT'S 'TUNE-UP' TIME FOR PRODUCTION MACHINES!

How long has it been since you "raised the hood" of your Ex-Cell-O production machines? Even the most reliable equipment will run faster, more accurately and *longer* after a thorough going-over by skilled Ex-Cell-O machine repairmen.

Ex-Cell-O machines returned for renewal, repair or modernization are carefully inspected, disassembled and reworked from base to bridge, with new machine accuracies. The products of preferential treatment, they move right alongside the newest Ex-Cell-O machines, rejuvenated by the familiar touch of the men who know your Ex-Cell-O machines best—the men who build them.

Necessary replacement parts are Ex-Cell-O "original equipment" quality; rewiring or re-worked controls conform to JIC standards; tables and ways are hand-scraped to their level-best; coolant and lubricant systems are restored to full efficiency, spindles are trued, and tooling can easily be up-dated to your specifications.

Call your local Ex-Cell-O Representative, or write direct for details on how your older Ex-Cell-O machines can be economically "tuned" to today's production demands.

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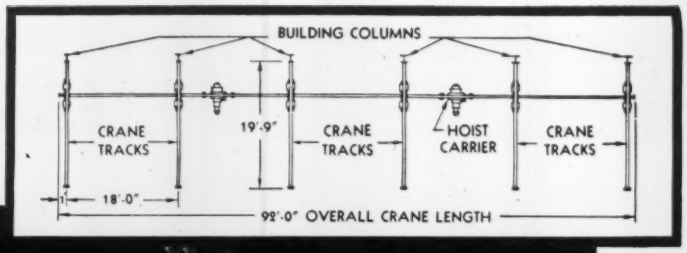

This Cleveland Tramrail installation permits unobstructed operation of other conveyances above and below the Tramrail tracks.

CLEVELAND TRAMRAIL 92'-0" CRANE OPERATES ON **SIX JIB TRACKS**

AN unusual Cleveland Tramrail crane installation serves the punching and spacing table in the structural shop of Omaha Steel Works, Omaha, Nebraska.

A 92-foot long crane extends the length of the table and operates on six jib tracks secured to the building columns. The tracks are supported near the middle and the end by tie rods.

The crane is power-driven and has two hand-propelled carriers with three-ton electric hoists. Conductors are SAFPOWRBAR® which assure maximum safety and reliability.

The Tramrail installation permits a heavy overhead crane to travel above and is devoid of special track support columns which would restrict movement of materials. The hoist carriers can be traveled quickly to any point on the crane and handle beams on the floor or machine. Beams of any length are easily maneuvered with the two hoists.

Thousands of plants are using Cleveland Tramrail in a multitude of ways to effect important savings. For any overhead materials handling problem, you will find it to your advantage to consult with Cleveland Tramrail sales engineers.

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Overhead Materials Handling Equipment

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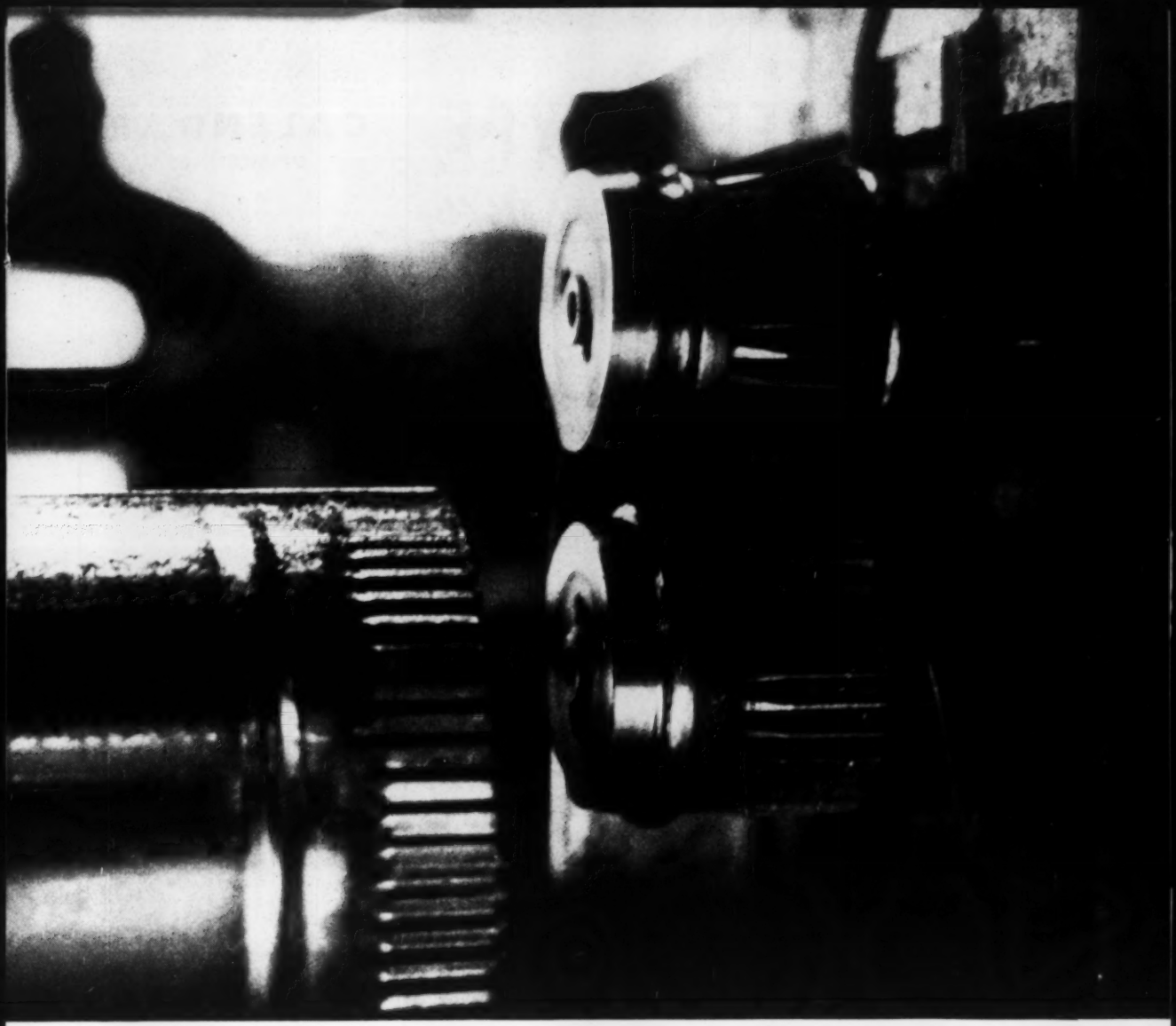

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Not a chip or flake mars its smooth zinc surface! And why should they? Weirkote's continuous process integrates zinc and steel so tightly that chipping and flaking do not occur and a new high in corrosion protection is assured.

Can you imagine what this means to repeated, top-notch production results? To the goodwill of your customers who will continually get the best finished products on the market? To your peace of mind, rid, at last, of annoying, costly rejects?

In spite of all these advantages, Weirkote's cost is low. One more good reason why you should write today for a free 12-page booklet that explains in detail how Weirkote can help you. Weirton Steel Company, Dept. **B-8,** Weirton, West Virginia.

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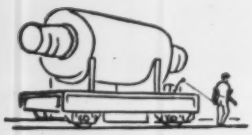
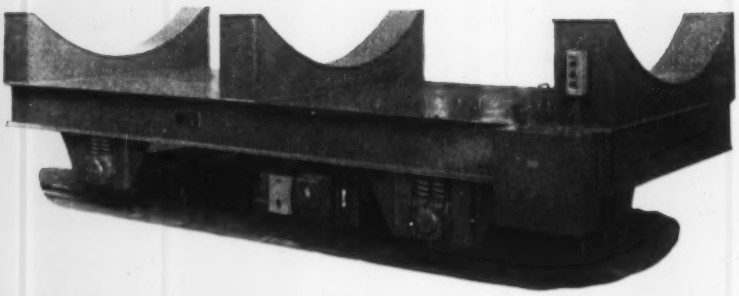


"SHORT HAUL" TRANSFERS

Atlas Safety-Type Transfers provide safe, low-cost service. Available with gas or diesel-electric, cable reel, or storage battery power. Atlas Transfers handle any type of load . . . and the heavier the load, the greater the savings.

20-TON STORAGE BATTERY FLAT CAR



20-TON STORAGE BATTERY WITH CRADLE FOR PIPE

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CALENDAR OF MEETINGS

Nov. 29-Dec. 3, American Institute of Steel Construction: Annual meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Nov. 29-Dec. 4, American Society of Mechanical Engineers: Annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Nov. 30-Dec. 4, Exposition of Chemical Industries: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Dec. 2, Electric Overhead Crane Institute Inc.: Annual meeting, Carlton House, Pittsburgh, Pa. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive Secretary: Joe H. Peritz.

Dec. 2-4, Metallurgical Society of AIME: Electric furnace steel conference, Sheraton-Cleveland Hotel, Cleveland. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Dec. 2-4, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria Hotel, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Executive vice president: Charles R. Sligh Jr.

Dec. 4-6, National Federation of Independent Scrap Yard Dealers Inc.: Convention, Plaza Hotel, New York. Federation's address: 29 Broadway, New York 6, N. Y. Counsel: Morris Rosoff.

Dec. 6-9, Drop Forging Association: Winter meeting, Savoy-Hilton Hotel, New York. Association's address: Public Square Bldg., Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

Dec. 6-10, American Institute of Chemical Engineers: Annual meeting, Sheraton-Palace Hotel, San Francisco, Calif. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Dec. 15, Material Handling Institute Inc.: Annual meeting, Savoy-Hilton Hotel, New York. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

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Jan. 6-8, American Management Association: Special packaging conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

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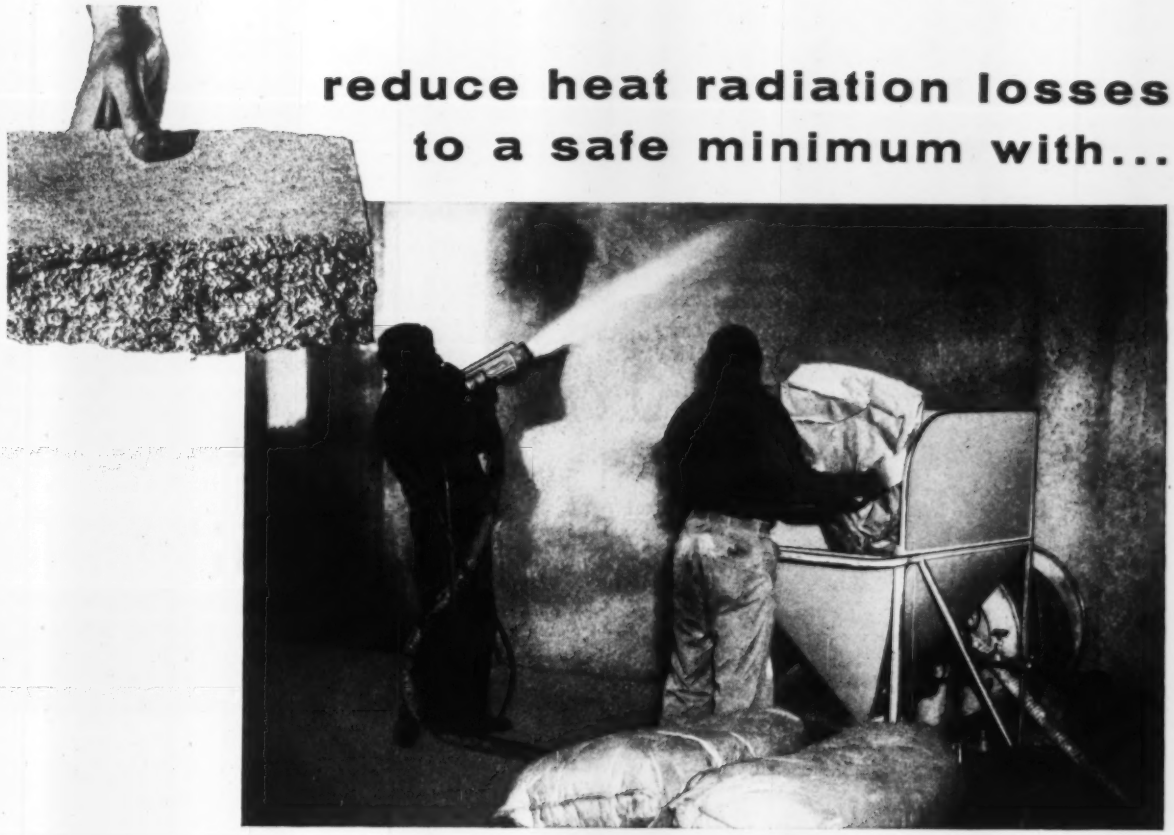

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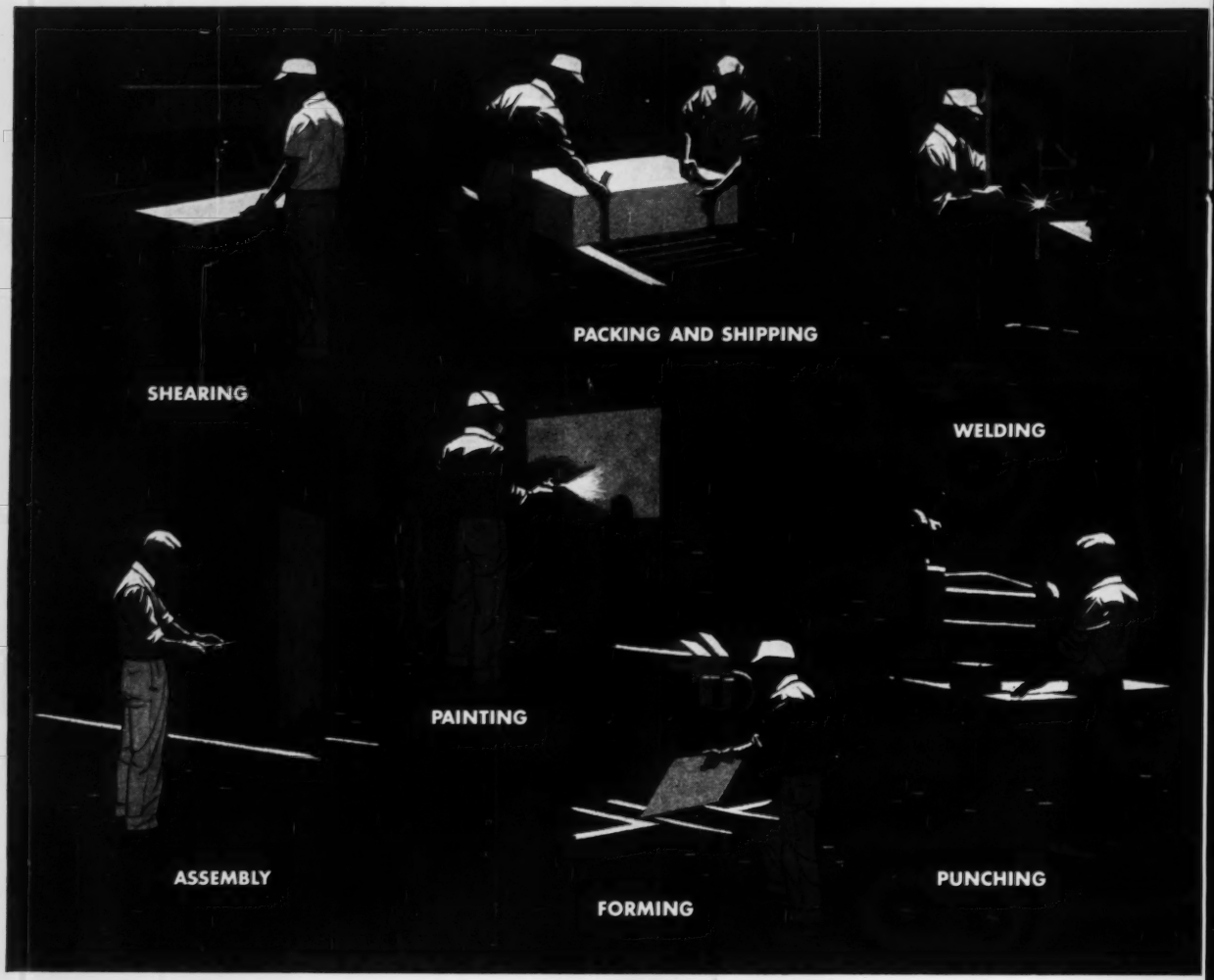

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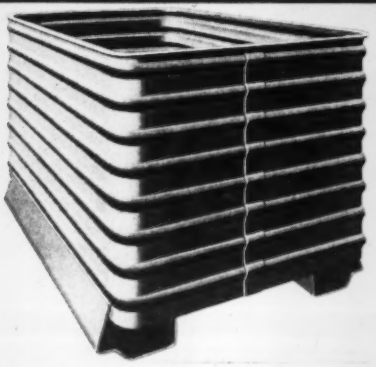

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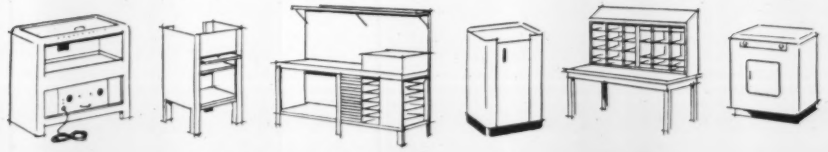

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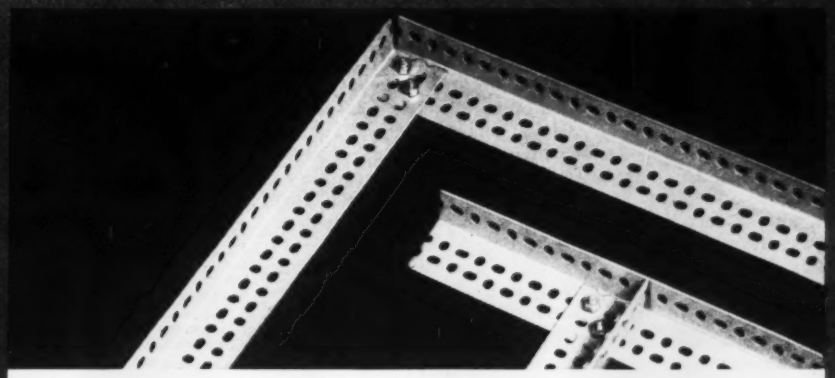

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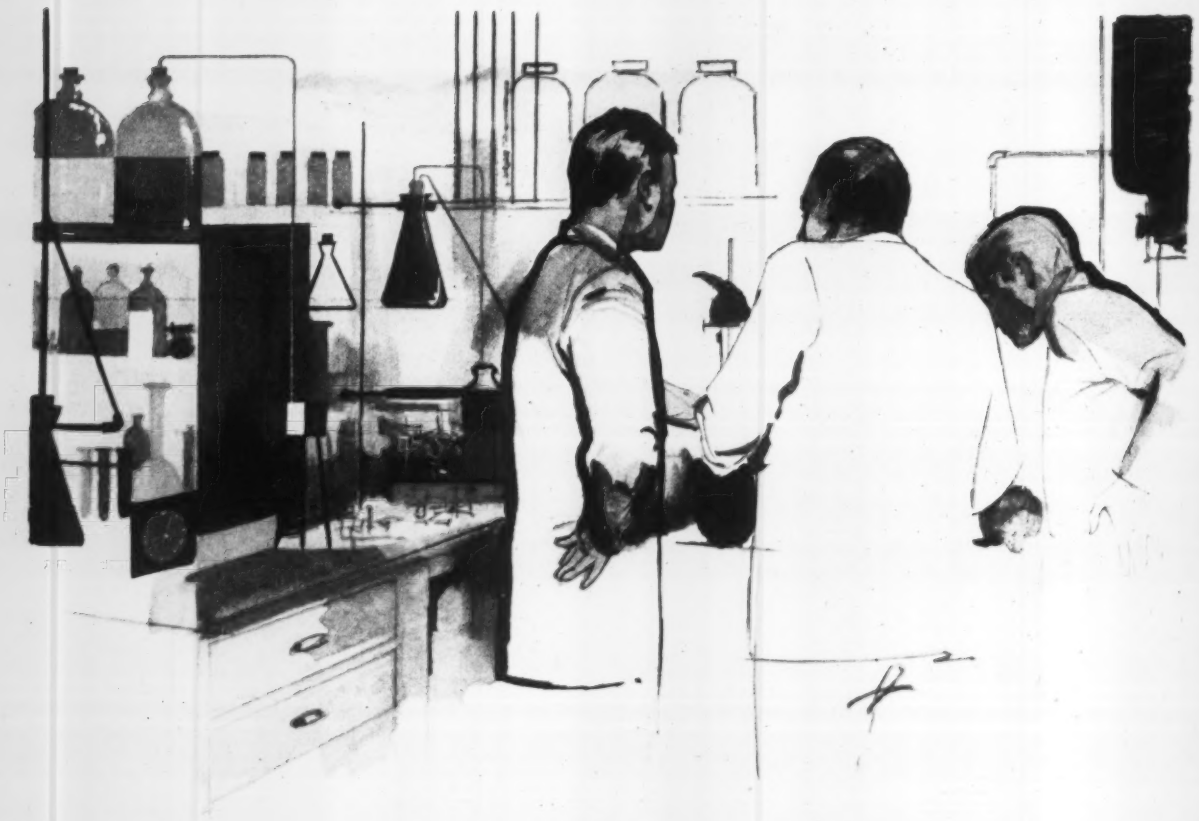

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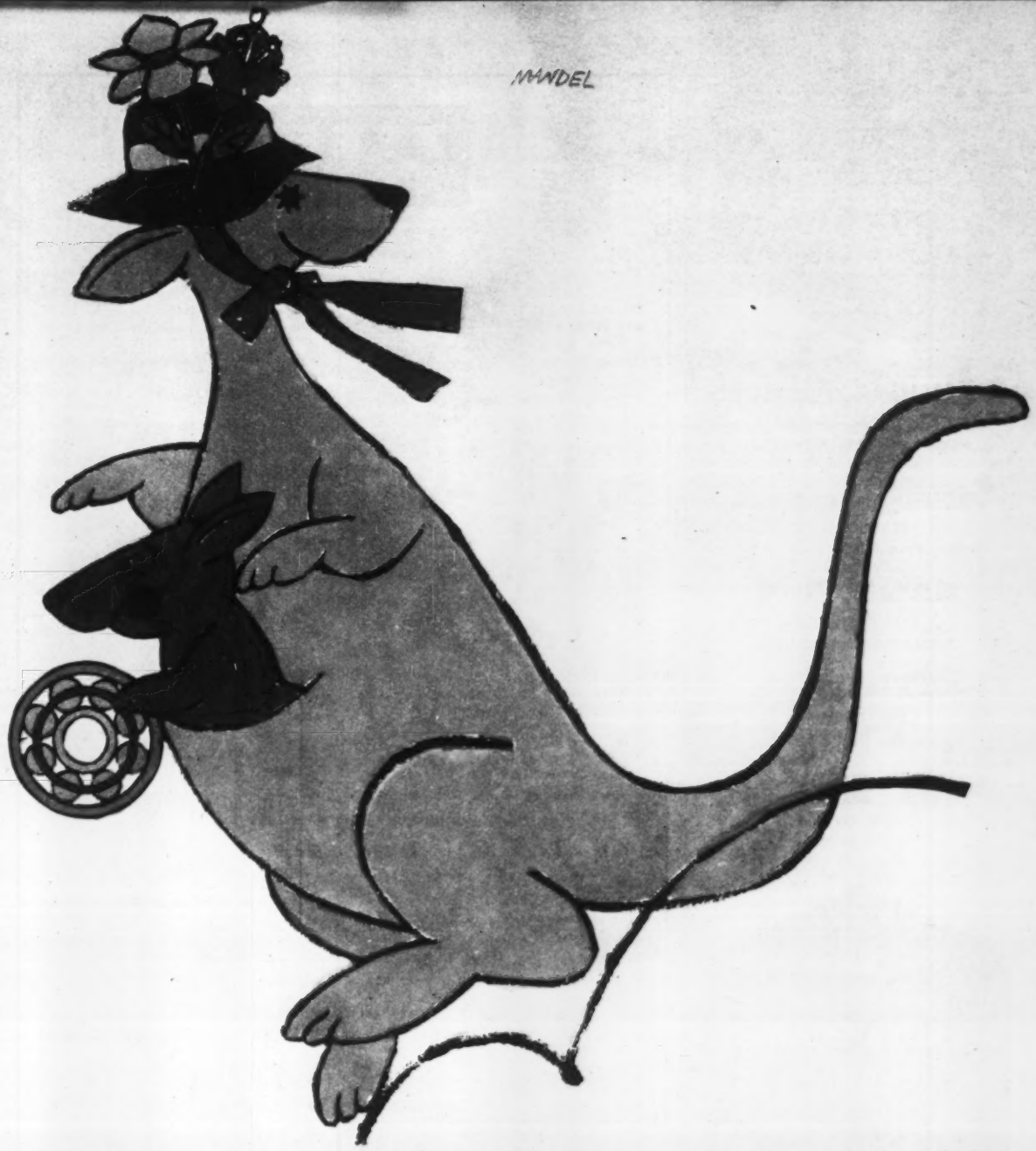

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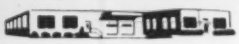

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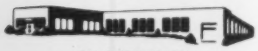

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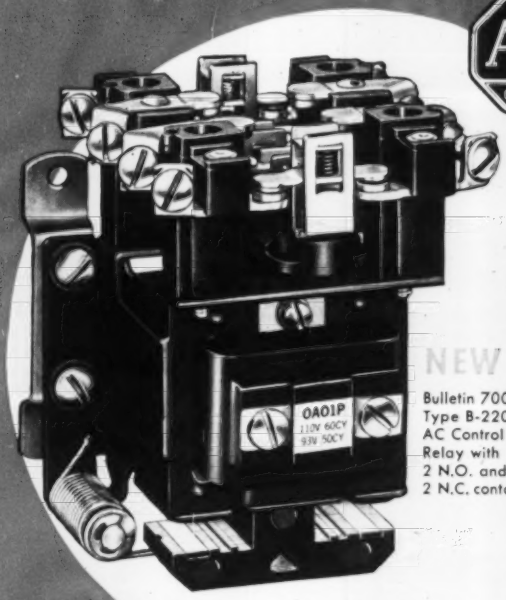

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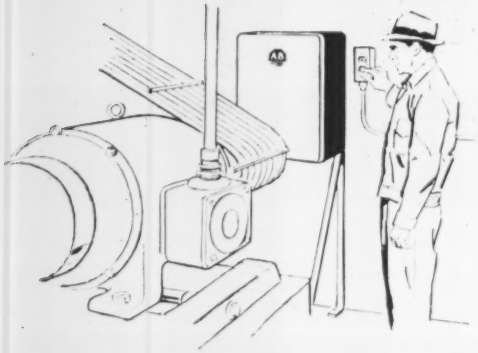

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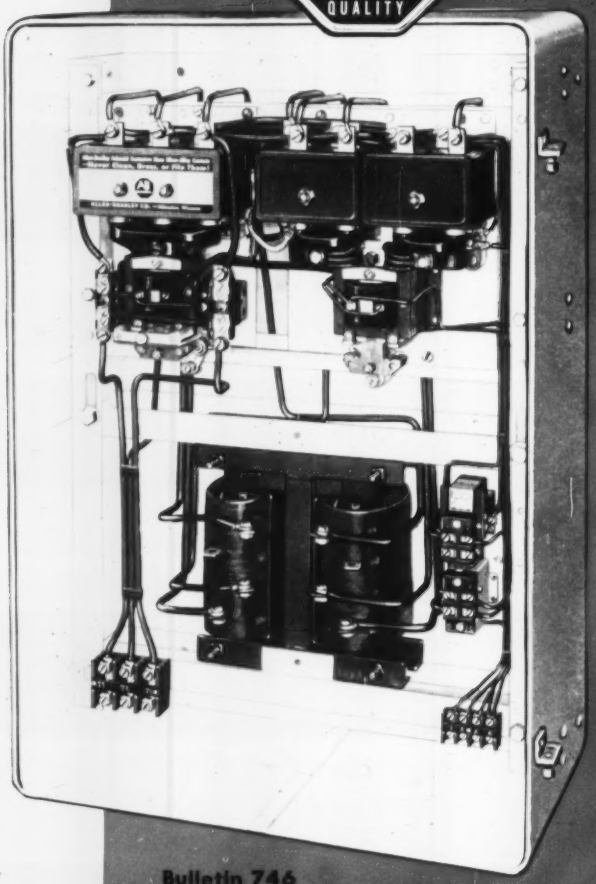

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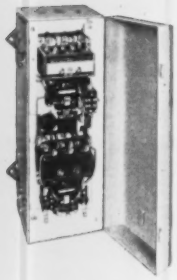

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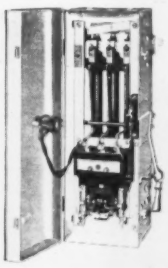

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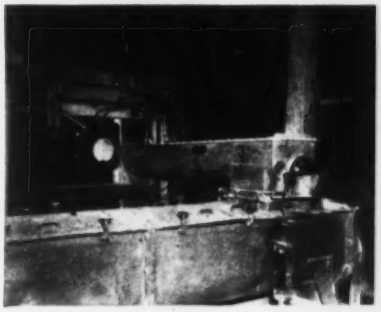

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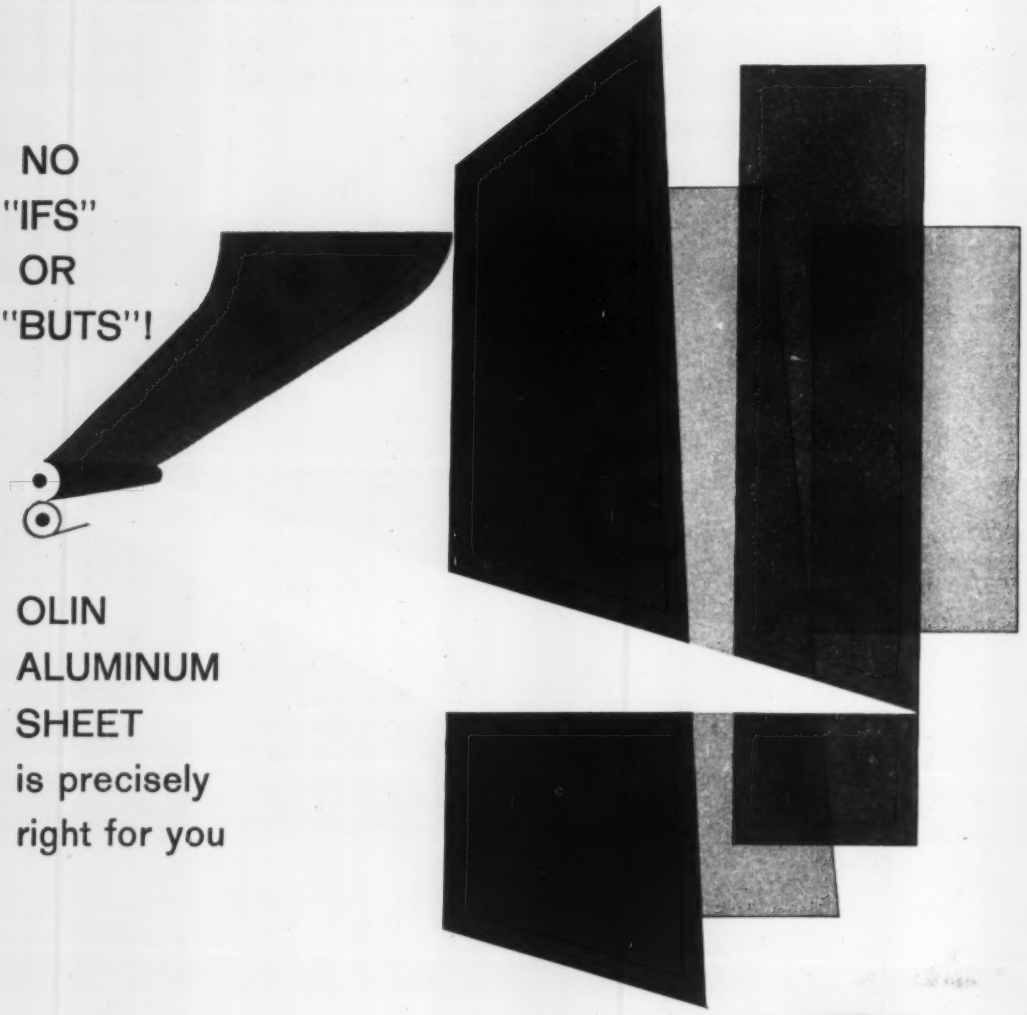

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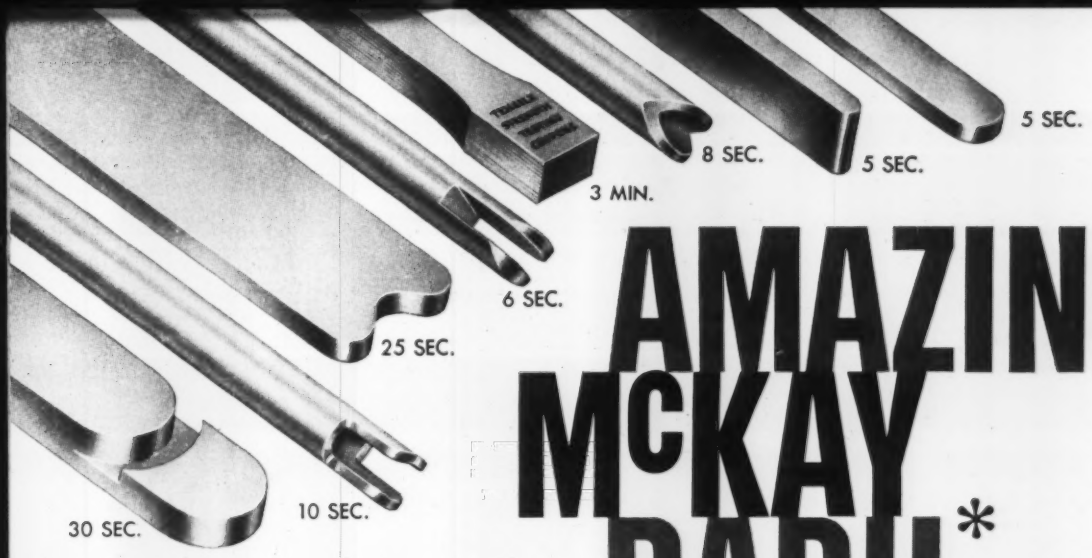
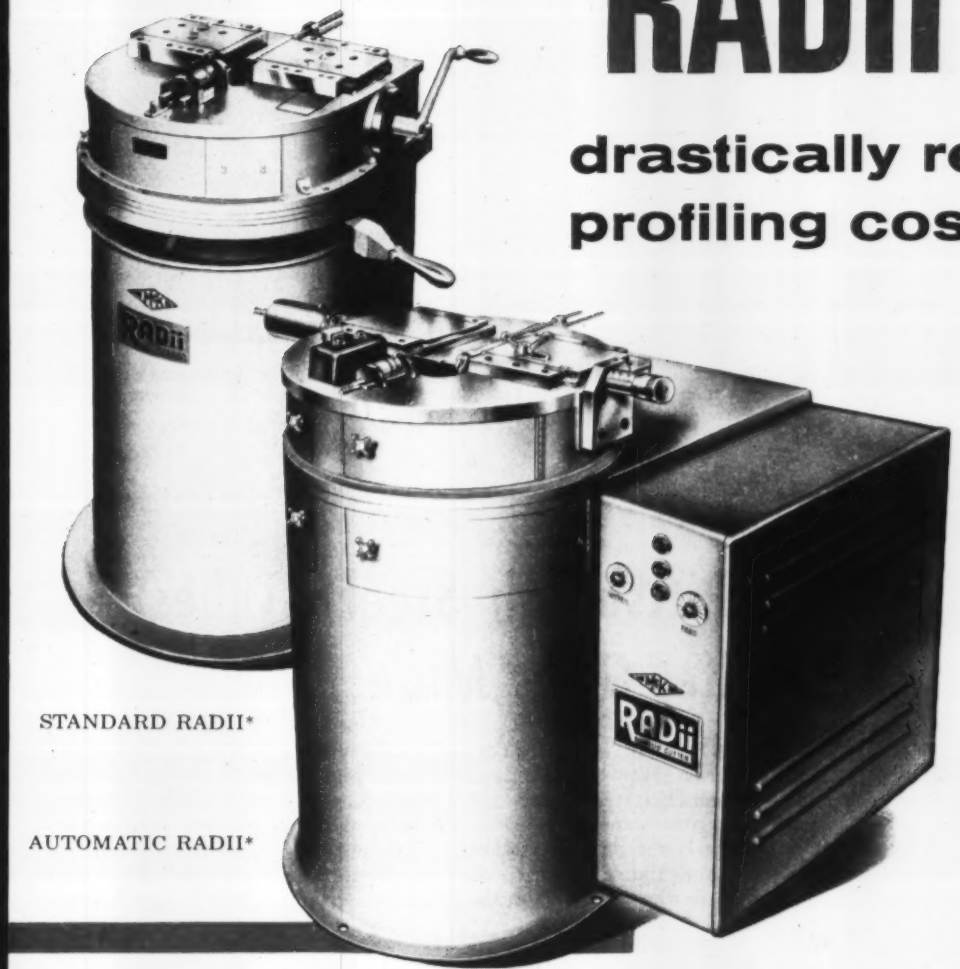


AMAZING McKAY RADII*

drastically reduces profiling costs!



STANDARD RADII*

AUTOMATIC RADII*

Precision profile milling can now be accomplished in seconds with unskilled labor.

The amazing new McKay Radii will cut either simple radii or irregular shapes with no set-up or layout. The operator simply slips the material to be profiled into a simple vise and moves a handle through a 180 degree arc.

Available in either manual or pushbutton automatic models the Radii is modestly priced and requires less than 10 square feet of floor space and only standard shop electrical and air facilities.

For literature or further information on this outstanding cost-cutter write *McKay Machine Company, Youngstown 1, Ohio.*

*Radii is a trademark of the McKay Machine Co.

McKAY McK MACHINE

Bearings in the making are these lengths of Pittsburgh seamless mechanical tubing in the charging rack of a high-speed automatic cutting machine at the plant of a leading bearing manufacturer. Special machining, hardening properties are built into tubes for this customer who produces more than 6,000 inner-rings per day.

Leading Bearing Maker Finds . . .

Machinability of Pittsburgh Steel's Tubes Lengthens Tool Life, Gives More Pieces

One of the nation's oldest and largest ball bearing makers used alloy bars for high-speed machining of a difficult bearing part for 20 years.

But when Pittsburgh Steel Company showed how low-carbon steel tubes could provide the machining and case-hardening properties required, this big-name manufacturer switched to Pittsburgh seamless mechanical tubing.

These were the clinchers:

- **More pieces per day**
- **Longer tool life**
- **Less machining and scrap**
- **Lower cost material**

The part involved was the inner-ring of a clutch throw-out bearing—a heavy production item at this customer's biggest plant since 1937. The bearing is the part that takes the abuse from the spinning clutch pressure-plate when you step on the clutch pedal.

To produce the inner-ring from low carbon steel, the customer demanded seamless tubing that was:

Highly machinable and uniform—for charging into a battery of 8-spindle automatic screw machines which subject each piece to 16 cutting operations.

Exceptionally hardenable and fine grained—for heat-treating to the hardness demanded of bearing steel and for finishing to ultra-close tolerance and super-fine surface.

The customer specified the grade of steel he needed to obtain these properties—AISI C-1024—then asked Pittsburgh Steel's sales engineers to produce it in seamless mechanical tubing.

The bearing maker's automatic machines produce 6,000 to 6,500 bearing inner-rings a day, testing the tubing's machinability with cutting tolerances as little as .003 inch.

Its hardening properties are

proven in a 21½-hour carburizing-hardening-temper cycle.

Structural characteristics meet the test in an integrated finishing-assembly operation that includes grinding and honing, and two 100 percent test operations.

The bearing maker's superintendent of primary operations sums up the advantages of Pittsburgh Steel's mechanical tubing this way:

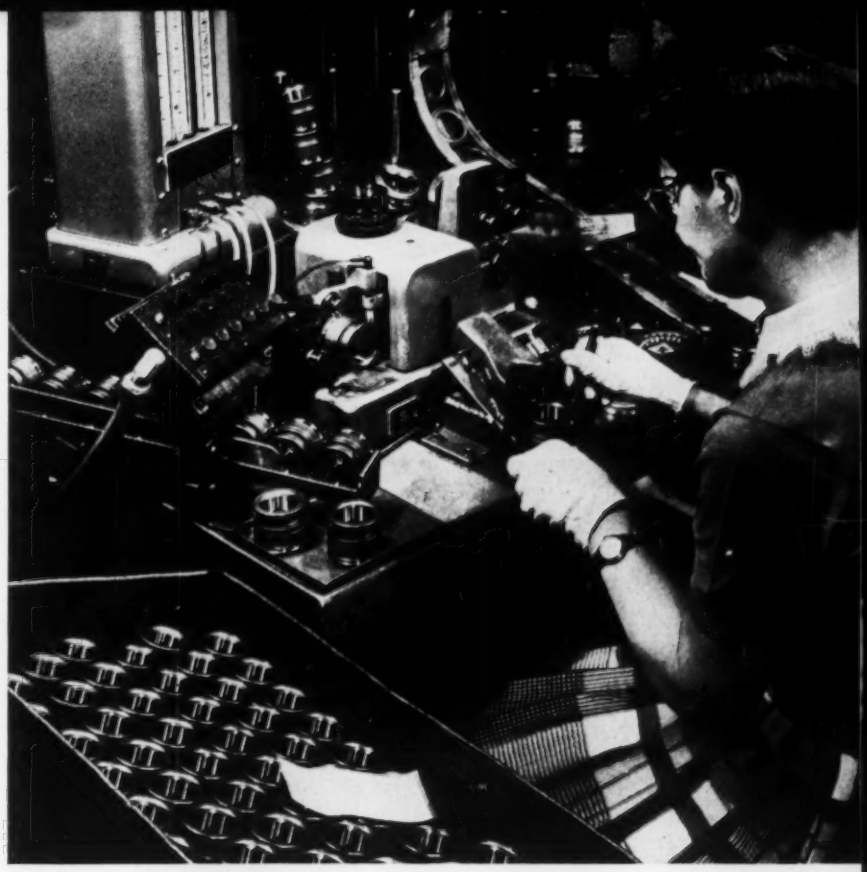
"We get more pieces during a day's operation. And we don't have as many chips to pull.

"We can use a boring tool and this stays in service longer than the drill needed for bar stock. Other tools used for ID cuts also stay in longer. So there we have lower tool costs.

"Finally, we are using a less expensive steel and gaining cycle speed. Since the inside drill speed is the controlling factor on cycle speed for bar stock, the elimination of this operation and the substitution of a boring tool permits cycle speeds of 25 seconds for tubing compared with 28 seconds for alloy bar stock or a little over 10 percent reduction."

This customer's experience with Pittsburgh Steel's seamless tubing—the advantages, the quality, the results—is typical of Pittsburgh Steel's ability to supply tubular products for special applications and of its ability to help customers obtain more profitable production.

These same benefits can be tailored to the needs of your operation requiring seamless mechanical tubing or any of the other tubular products made by the skilled tubemakers at Pittsburgh Steel Company.



Initial assembly—one of two 100 percent testing operations—is where seamless shows its merits in finished bearing.

Tubing proves its machinability here where it takes 16 boring, reaming, grooving, recessing and burnishing cuts.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Perry Kilsby, Inc.
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Service Company
Dayton, Ohio

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta, Chicago, Cleveland, Dayton, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Tulsa, Warren, Ohio

Atlas Steels' *26" 2-high reversing blooming mill*

speeds production under the **BIRDSBORO** *trademark*

And that trademark has come to mean quite a lot to steel producers in the U.S., Canada, Europe and other points on the globe. The strength and ruggedness demanded by the steel industry are blended with the advanced thinking and modern design ideas of the BIRDSBORO engineers. The result is productive and profitable mill machinery with a long, useful service life. The BIRDSBORO representative in your area can cite specifics. You'll find them very interesting. *Sales Department, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

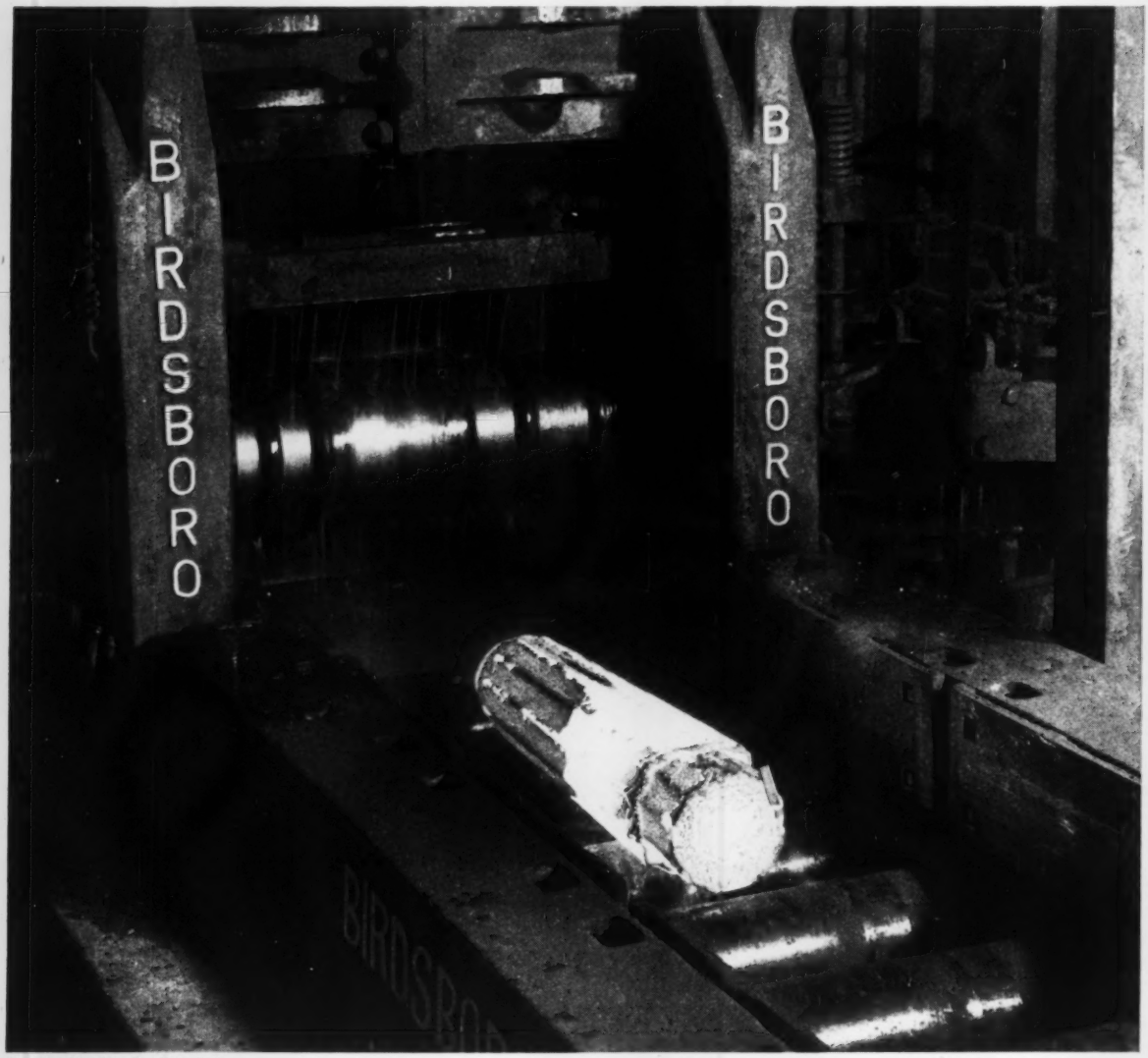


Photo Courtesy Atlas Steels Limited

MM-74-9

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Meeting of minds and methods

THE specialized talents of McKee engineers and the experienced skills of McKee construction experts meet on plant projects like yours all over the world. It is this meeting of imaginative engineering minds and modern construction methods that assures you correct design and sound construction of your plant.

The McKee insignia is a familiar sight to petroleum and chemical men in thirty-six countries. They're familiar with McKee results, too—that's why more than eighty percent of our work is repeat business from satisfied customers.

If you are planning new processing facilities or related projects, large or small, in any location, we would welcome an opportunity to show you the many advantages of McKee services.

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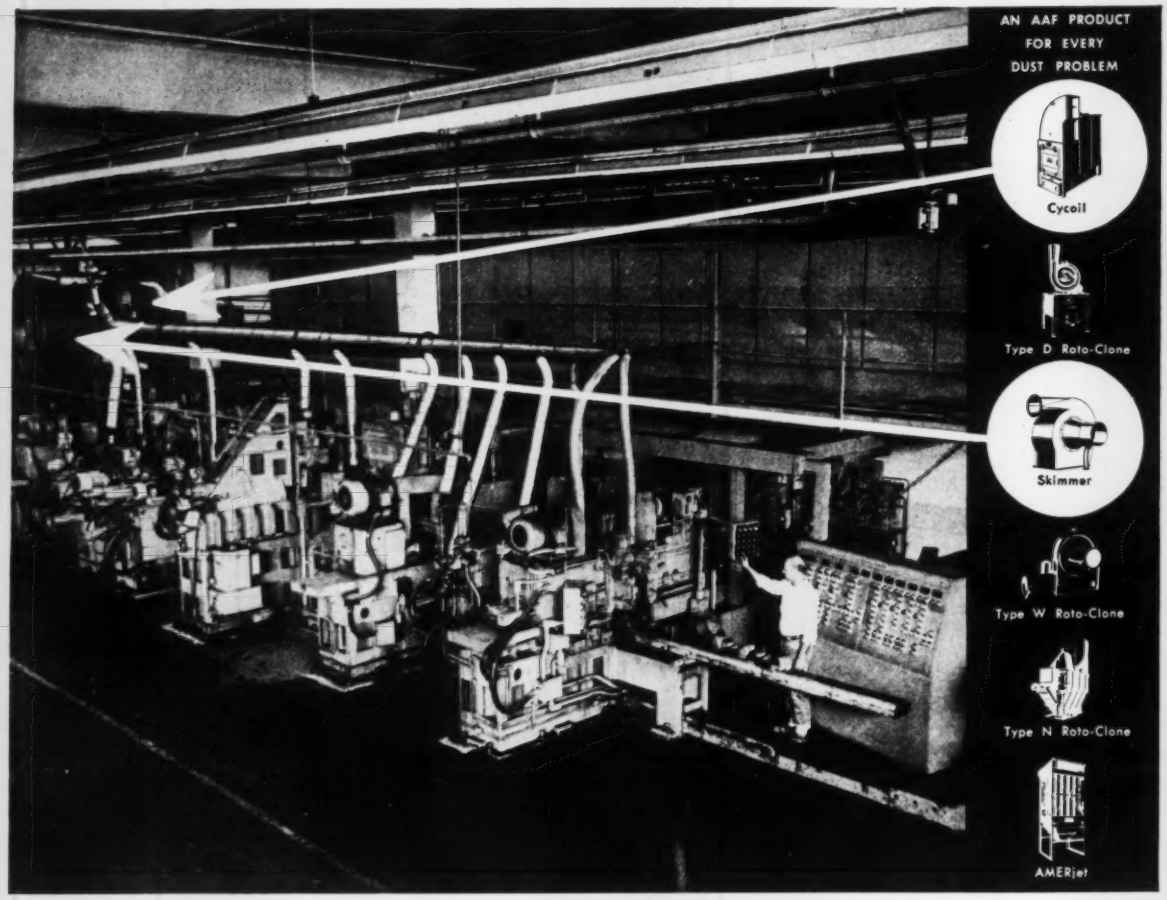
McKEE ENGINEERING AND CONSTRUCTION SERVICES

DRY MACHINING



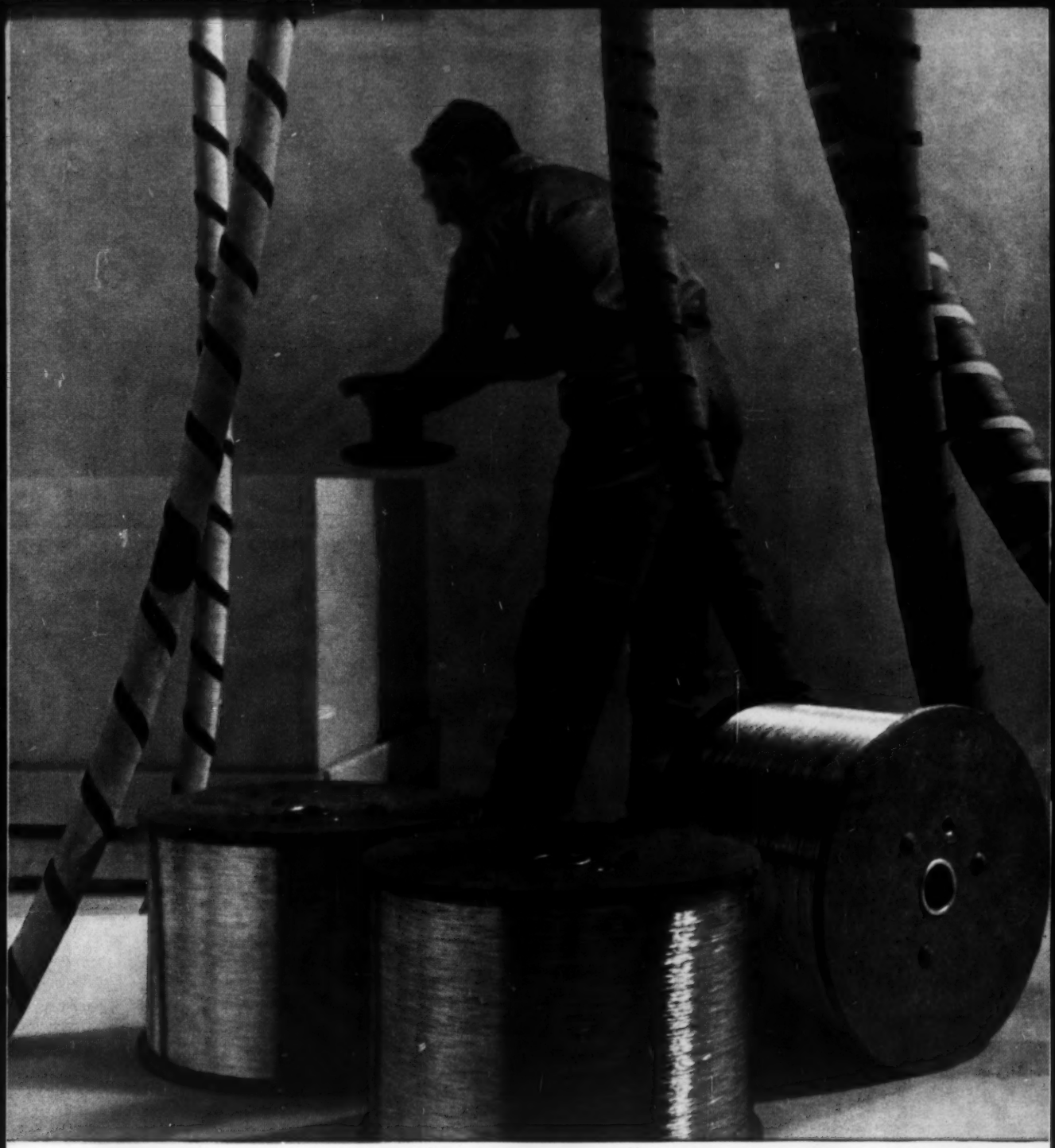
AAF Skimmer-Cycoil team gives new life to dust-laden air

● Motor frames are machined in progressive stages along this automatic transfer machine. Each operation produces dust; each is hooded and its dirty air channeled into an AAF Skimmer pre-cleaner where the bulk of the dust is removed. The partially cleaned air then passes through a high efficiency AAF P-17 Cycoil and is recirculated—*clean.*

AAF's complete line of dust control equipment was application-developed, now challenges *any* metalworking dust problem, regardless of the metal. Where are troublesome dust, fumes or mists causing you trouble—grinding, buffing, polishing, plating, dry machining, wet machining, heat treating, abrasive cleaning? All can be effectively and economically controlled by AAF.

For the answer to your dry machining problem, call your local American Air Filter representative, or write for Bulletins 276 and 285. Address: Mr. Robert Moore, American Air Filter Company, Inc., 443 Central Avenue, Louisville, Kentucky.

AAF American Air Filter
BETTER AIR IS OUR BUSINESS



Roebling Hose Reinforcing Wire... The best things come in no-charge packages

When you buy Roebling Hose Reinforcing Wire it is delivered to you on no-charge spools that mean savings to you.

This modern method of packaging does away completely with deposits and the bookkeeping involved; it contributes, too, to lower freight costs. Thus, you avail yourself of a precision-made and quality controlled product, without any handling, shipping and inventory inconveniences.

Roebling Hose Reinforcing Wire, used for braiding reinforcement, is produced in a complete range of sizes. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

Roebling... Your Product is Better for it

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

THE OTHER TURN

HOPE FRENCHY DOES A BETTER JOB WITH THAT FANCY TV DINNER THAN HE DOES MAKIN' STEEL.
HE'S BEEN STUDYIN' THEM DIRECTIONS FOR THE LAST HALF HOUR, MAYBE HE CAN'T READ.
IF HE WORKS AT IT, MAYBE HE'LL GET THAT CHOW HOTTER THAN THE HEATS HE'S BEEN TAPPIN' LATELY.
T.V. DINNER TURKEY
THANKS TO
JOE BAUER
FIRST HELPER, ELECTRIC FURNACE, CRUCIBLE STEEL CO., MIDLAND, PA.

The Hot Lunch

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

Magnefer and Syndolag Set Fast—Stay Fast

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

Steel Output Surges, But Many Shortages Are Still Likely

Less than two weeks after the steel mills reopened, furnaces were pouring steel at the rate of 2,237,000 ingot tons weekly (79 per cent of capacity); the operating rate may exceed 90 per cent by early December (Page 107). But even that bounding recovery won't be fast enough to stave off mounting shortages. A STEEL survey of more than 100 steel users across the nation finds that 39 per cent expect shortages of steel next year. A few anticipate shortages of aluminum and copper.

'59 Profits Soar Above '58's; How Metalworking Stacks Up

The First National City Bank of New York checked the profit performance of 598 leading manufacturers for the first nine months of this year and the like period of 1958. Here's what they found:

	Per cent change 3rd Qtr, 1959, vs. 2nd Qtr	9 Mo., 1959, vs. 9 mo., 1958		Per cent change 3rd Qtr, 1959, vs. 2nd Qtr	9 Mo., 1959, vs. 9 mo., 1958
All manufacturing	−32	+43	Other metal products	−15	+39
Iron & steel	*	+34	Cement, glass & stone	−9	+44
Electrical equipment	+12	+32	Petroleum	+10	+14
Machinery	−3	+26	Paper	−7	+29
Automobiles & parts	−65	†	Chemicals	−17	+62

*Decrease of more than 100 per cent. †Increase of more than 100 per cent.

Copper: Coming Up for the Sixties

Look for the coming decade to bring copper producers record sales, new markets, and sufficient capacity to satisfy any foreseeable demand. Expect fewer and less violent price fluctuations, mechanization of the mines, and more intense research and development. And look for the copper people to promote their product harder than ever before. They may recapture some lost markets. Automotive uses seem to have about stabilized; electrical and construction applications are growing rapidly (Page 37).

September Was Good Month for Metalworking

September orders for material handling equipment rose to 126.43 (1954 equals 100) from 87.02 in August and 85.41 in September, 1958, reports the Material Handling Institute . . . September orders for foundry equipment dropped about 2 per cent from the August level but were more than

double the total for the year-earlier month, notes the Foundry Equipment Manufacturers Association . . . Radio output in September totaled 1,981,208 units (one of the best months in history), and TV output rose to 808,377 units (the best month since September, 1957), reports the Electronic Industries Association . . . September orders for screw machine products climbed 16 per cent above the August level and 40 per cent above the September, 1958, mark, says the National Screw Machine Products Association . . . September shipments of industrial fasteners edged 3 percentage points above the August level to 115 (1947-49 equal 100), reports the Industrial Fasteners Institute.

How Not to Die

This forlorn spirit failed to carefully plan his estate. Of course, he couldn't take it with him, but he left less behind than he would have with a well planned estate. Paying the high costs of dying can wipe out the business owner's major estate asset. A popular way to guard against that is the purchase and sale agreement incorporated into an estate plan. It can take the form of an option contract or an absolute selling agreement (Page 52).

Reuther Picks Up More Power

At the Industrial Union Department convention in Washington this month, Walter Reuther provided some clues to his future attitude toward the AFL-CIO and to the big labor targets of the next few years. Mr. Reuther will keep his industrial unions firmly in the federation, but he'll take up more tasks to push the labor movement in areas where he thinks the federation has shown "flabby" leadership. Among his targets: 1. Get the industrial unions to co-operate on organizing drives, especially for whitecollar workers, farm laborers, and government employees. 2. Centralize bargaining among IUD unions. 3. Step up lobbying in Congress to get broader social legislation. 4. Barrage members and the public with union propaganda.

Where You Can Use Explosive Forming

You don't have to be making missile parts like the one in the picture to use explosive forming. Du Pont engineers find the technique is good in single shot forming, finish sizing, hardening of austenitic steels, mating of parts (Page 74).

Strike Lowers GNP's Rate

National output of goods and services in the third quarter was affected more by the steel strike than federal economists had estimated. The gross na-

tional product dropped to a seasonally adjusted annual rate of $478.6 billion —down $5.9 billion from the second quarter pace. (Government economists had estimated the drop at $3.5 billion.) Total '59 output is now estimated at $480 billion vs. last year's $441.7 billion.

Our Chip Making Inefficiency Is a National Disgrace

So charges Horace Frommelt, director, Spring Garden Institute, Philadelphia. He says it's time we stopped babying a $50,000 machine tool to extend the life of a 20 cent cutting edge. Mr. Frommelt advocates: Keep the tool on the job as short a time as possible; that's the way we can squeeze the most out of high cost capital equipment, high labor charges, and mountainous overhead. Tools are running at speeds that call for a change not more than every 8 hours when they probably should not be run longer than 30 minutes, he says (Page 78).

FRB Index Stays High

The Federal Reserve Board index of industrial production dropped 1 point in October to a seasonally adjusted 148 (1947-49 equals 100). The September figure was revised to 149, matching August's, so the total drop caused by the steel strike was 7 points—less than had been expected. Main reason: Metal fabricating activity held remarkably close to the prestrike level (June —184, July—186, August—182, September—183, October—182).

Steel Homebuilder Shows Ten New Models

The "Lynnfield" at left is one of ten new Steelstyle homes in the 1960 line of units built by U. S. Steel Corp.'s Homes Div. The line features steel framed panels, a factory assembled truss system, and other steel parts. Available are steel chimney and hood systems, steel threshold supports, and all-steel cupolas. The ten models come in 82 floor plans.

Construction Sails Along

Heavy construction contracts awarded during the first 46 weeks of this year exceed $18 billion—4 per cent more than in the like 1958 period. Industrial building continues to be the pacemaker, running 66 per cent ahead of the 1958 pace. Other strong spots: Waterworks—up 29 per cent, mass housing —up 22 per cent, commercial building—up 17 per cent.

Space Research to Boost Metalworking's Share of GNP

Metalworking sales will soar to $375 billion by 1975, accounting for half the nation's gross national product (vs. about one-third today), predicts

METALWORKING OUTLOOK

Walter Crafts, president, American Society for Metals. He says the growth will result from the huge expenditures being made on research and development to meet Space Age requirements.

Trying to Crack Foreign Markets?

You may get some ideas from the experience of Acme Mfg. Co., Ferndale, Mich., which found that overseas operations are pretty much an uncharted area for smaller U. S. firms—it built its German plant four years ago (Page 44). Language barriers and lack of European business knowhow were the firm's chief hurdles.

Electric Capacity Zooms

By yearend, the U. S. electrical industry will have a generating capacity of 159 million kilowatts—10.3 per cent above the year-ago total, reports Edison Electric Institute. Capacity will be lifted to 192 million kilowatts by the end of 1962, says EEI.

You'll Get Better Gas Mileage in 1970

"It would not surprise me a bit to find the average per-mile fuel consumption of all cars on the road in 1970 a full third less than it is at present," declares Harry E. Chesebrough, general manager of the Plymouth-De Soto-Valiant Div. of Chrysler Corp. He predicts that there will be 83 million cars in use by 1970—24 million more than today. About 20 million will be economy cars capable of 25 miles per gallon or better, he believes.

Jets: New Power for Industry?

Mt. Vernon, Ohio, is the scene of an experiment that may prove significant to metalworking. Cooper-Bessemer Corp. and Pratt & Whitney Aircraft are modifying a J-57 jet engine to drive a gas turbine, converting the jet's mighty thrust into commercially usable horsepower.

Straws in the Wind

The government's wholesale price index declined 0.4 per cent in October to 119.2 per cent of the 1947-49 level, but the metal and metal product category registered a 0.5 per cent gain . . . Look for the auto industry to buy about 3.8 per cent less steel per car produced in 1960 than in 1959, say steel industry analysts. Reason: Spiraling sales of compact cars . . . Timken Roller Bearing Co. plans to sell its English subsidiary, Fisher Bearings Co. Ltd., to Fafnir Bearing Co. Ltd., and "concentrate wholly on its principal product, tapered roller bearings" . . . Continental Can Co. is making aluminum oil cans for Gulf Oil Corp. and Texaco Inc. . . . Boeing Airplane Co. will acquire Vertol Aircraft Corp. . . . Studebaker-Packard Corp. and Oliver Corp. are continuing "exploratory conversations" concerning S-P's possible acquisition of Oliver's farm equipment business . . . Canadian rail labor talks begin Wednesday (Nov. 25) . . . Aluminum Co. of America plans to build Mexico's first primary aluminum smelter; with capacity of 20,000 metric tons, it will go on stream in two years.

NOT ALL LEADED STEEL IS MADE BY INLAND...

BUT...

we've made more of it than anyone else . . . in fact, the first experimental heat and the first production heat of leaded steels were made in Inland furnaces.

Since then, more than 20 years ago, we've never stopped probing, refining, perfecting the process. And today we offer INLAND LEDLOY*—the leaded steels of highest quality, uniformity and dependability—the standard against which all other free machining steels are compared!

If you have any question about leaded steels . . . if increased machinability, higher speeds and feeds, easier tolerance control, greater production per tool change and fewer finishing operations sound good to you . . . we suggest you come to Inland . . . makers of LEDLOY, the original leaded steel.

INLAND LEDLOY steels are available in a wide range of standard carbon and alloy grades in bars or plates from your Cold Drawer or Steel Service Center. See them for LEDLOY and write to Inland for the booklet, "Properties of Inland Ledloy Steels".

*Reg. Trade Mark

LEDLOY *the world's most machinable steels!* INLAND STEEL *30 West Monroe Street · Chicago 3, Illinois*

INLAND *Sales Offices:* Chicago · Davenport · Detroit · Houston · Indianapolis
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WHY ARMCO 17-7 PH STAINLESS HELPS ASSURE PRECISION PERFORMANCE AND LOW COST FOR ELECTRIC SWITCHES

A leading manufacturer of subminiature, small industrial and commercial, and precision electric switches recently specified Armco 17-7 PH Stainless Steel for the center blades and patented rolling springs in many of their products. A non-ferrous spring material was replaced with 17-7 PH Stainless because its unusual characteristics offered the opportunity to improve the reliability and performance of their switches at low cost. The mechanical life of one part was increased from 30,000 to 30,000,000 cycles!

Using this special material in the hard temper condition, they obtained:

Ultimate tensile strength of 220,000 psi
Tensile yield strength of 190,000 psi
Fatigue strength of about 85,000 psi at 10^7 cycles
Good corrosion resistance, much superior to that of the hardenable chromium grades of stainless steels.

Where even greater strength is needed, Armco 17-7 PH hard temper (Condition C) sheet and strip can be heat treated to a typical ultimate tensile strength of 265,000 psi. And, if parts require extensive fabrication, they can be easily formed from annealed 17-7 PH then hardened to high strength and hardness.

Improve the reliability and performance of your products by using 17-7 PH Stainless Steel for parts that require high strength and hardness up to 900 F, good corrosion resistance, and excellent fabricating characteristics. Armco 17-7 PH is available in sheets, strip, plates, bars, and wire; a companion grade, Armco 17-4 PH in bars, wire, and billets.

Just fill out and mail the coupon for complete information on the properties and fabrication of these special stainless steels.

Armco Steel Corporation
1609 Curtis Street, Middletown, Ohio

Send me information on: ☐ Armco 17-7 PH Stainless Steel ☐ Armco 17-4 PH Stainless Steel

We are considering these materials for the following applications:

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ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Steel Won't Hurt '60 Business!

There is too much unwarranted apprehension over the effects of the steel strike on 1960 business.

Sure, losses in steel production, steel sales, and wages were tremendous.

Sure, some plants will be obliged to cut back production until supply lines can be refilled. In fact, the overriding effects of the strike will be felt for many months.

But most industrial plants accumulated steel inventories large enough to maintain production during the steel shutdown.

As a result, the FRB industrial production index dropped less than expected—from a record high of 155 in June to 148 in October. The high point of prosperous 1957 was 146.

The index will probably climb to 150 in November as a reflection of the unexpectedly rapid recovery in steel operations.

With the steelmaking rate already close to 80 per cent of capacity, November production will be at least 7 million tons, December production 11 million—vs. only 1.7 million in October.

With production of 92 million tons, 1959 still stacks up as a good production year when comparison is made with the 85 million tons produced in 1958.

Next year will be even better. In the first six months, the steel industry expects to produce 69.8 million tons, which will eclipse record first half production of 64.3 million tons in 1959. Annual production is estimated at 130 million tons.

No strike so far has reversed an established uptrend in business, and the 1959 steel strike will be no exception!

Sure, no one can foresee whether the steelworkers will go back on strike Jan. 27 after the 80 day Taft-Hartley moratorium. But don't forget: Labor, management, and Congress know the nation can neither afford nor tolerate another steel strike so soon.

Irwin H. Such

EDITOR-IN-CHIEF

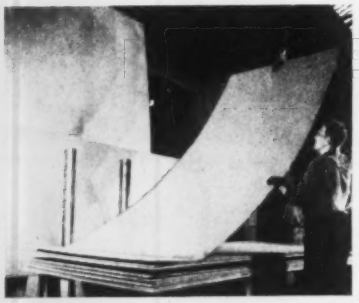
STAINLESS DIRECTORY

Buyers Guide to Ryerson Stainless Stocks & Services

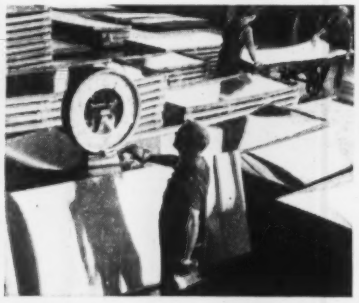
Here's a quick guide to the nation's largest stocks of stainless steel. This wide selection assures you of getting the best stainless for every application.

Extra care in storage, handling and shipping guards the high quality of Ryerson stainless stocks. For example, shear clamps are padded to protect the fine finish and flatness of sheets. And in addition, the help of experienced stainless specialists is yours when you call Ryerson on problems of application or fabrication.

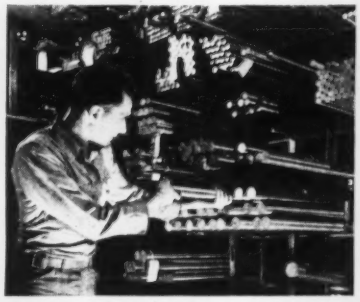
See your Ryerson catalog for a complete listing of stainless stocks and call your nearby Ryerson plant for immediate shipment.



PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also low carbon types for easy welding.



SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs, expanded and perforated sheets.



BARS AND ANGLES—Rounds, squares, flat's, hex's and angles in 8 types including free-machining bars with both analysis and mechanical properties controlled.

RINGS AND DISCS—Machine cut to your order. This service assures size accuracy, smooth edges, flatness and unaffected corrosion resistance in a lower-cost, ready-to-use product.

HEADS—A.S.M.E. flanged and dished heads in types 304, 304L, 316 and 316L are on hand in large quantities, and in a wide range of gauges and sizes.

PIPE AND TUBING—Light wall, standard and extra heavy pipe, ornamental and regular stainless tubing. Also screwed type and welding fittings and Cooper stainless valves.

I·V·B·M
Increased Value in Buying Metals
Ask about this Ryerson Plan for 1959

RYERSON CERTIFIED QUALITY

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

Principal Products: Carbon, alloy and stainless steel — bars, structurals, plates, sheets, tubing — aluminum, industrial plastics, metalworking machinery, etc.

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BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE · ST. LOUIS · DALLAS · HOUSTON · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

How Copper Leaders View Future

PRODUCTION:

Expect tight supply for up to six months after the strike ends. After that: Plenty to go around. Free World capacity will exceed demand by at least 10 per cent through the '60s.

CONSUMPTION:

Look for usage to grow 3 to 4 per cent annually in the next decade. Demand will increase faster in Europe than in U. S.

PRICES:

They'll still fluctuate because the metal is an international commodity subject to world market conditions. But coppermen think the changes will be less frequent and violent.

MARKETING:

Watch for more aggressive advertising, promotion, and research and development programs—perhaps on an industry-wide basis. Producers are out to recapture lost markets, as well as develop new ones.

THE COPPER INDUSTRY stands on the threshold of the "soaring sixties" confident that in the coming decade it will post new records in sales, develop new markets and expand old ones, and have the capacity to produce enough metal to satisfy any foreseeable demand.

That's the consensus among top copper executives who indulged in some forecasting at the request of STEEL editors to help metalworking managers chart the market of the sixties. Copper leaders also believe: Price fluctuations will occur less frequently and be less violent than in the past, promotional and research and development activities will be stepped up, and mechanization of mines and fabricating plants will be even more of a top priority project.

• **Copper, and More Copper**—You don't have to worry about a shortage in the sixties. If anything, there will be an overabundance (see Robert G. Page's comments on Page 39). Free World mine capacity will rise to 3,883,000 tons this year, to 3,957,000 tons in 1960, and to 4,189,000 tons by 1962. Tentative expansion plans will hike the figure to 4,329,000 tons. Explorations for new deposits go on continually so additional new facilities will undoubtedly be brought in during the next decade.

If all the mines in the Free World were running at capacity, yearly excess would run over 200,000 tons, says Clyde E. Weed, chairman, Anaconda Co. But the industry rarely operates at 100 per cent of capacity, he adds, because there are always some temporary shutdowns resulting from such things as labor troubles, flooding, or lack of water.

John D. MacKenzie, chairman and president of American Smelting & Refining Co., believes that by 1964, if all mines were operating at full capacity, excess production would be only 5 to 7 per cent. (At the minimum capacity estimated for 1964, that would mean a yearly excess of 210,000 to 290,000 tons.)

• **Mixed Blessing**—To the user, excess capacity is good news. To the producer, it's a blessing with problems. He has deliberately expanded capacity beyond demand so new markets can be developed and so designers won't shy away from copper for fear of inadequate supplies as they have in the past. Mr. Weed says the realization by producers that they must keep supply in excess of demand to expand usage is the most important development in copper.

Since the industry has never been able to control production, the prob-

able result will be large surpluses overhanging the market from time to time in the coming decade, with a resultant weakness in prices.

• **Goal: More Stability**—Fluctuations in price have been the No. 1 user complaint and the producers are well aware of it. If the desire to level out the erratic price cycles that have plagued copper remains as strong as it is today, you can look for these attempts at control: More resistance on the part of domestic producers to pressures on the U. S. market from overseas and speculative interests; better co-ordination of production and consumption; an active world-wide program to expand uses.

• **Looking Ahead**—If you average out the growth anticipated for copper over the next decade, it will run between 3 and 4 per cent a year (see John D. MacKenzie's comments on Page 39). Probably the most bullish factor is the predicted jump in population (growth traditionally follows the population curve). Per capita consumption in the U. S. is slightly under 15 lb; in much of the rest of the world it averages under 2 lb. As technology begins to spurt in other lands, as it has in Western Europe over the last few years, per capita consumption should climb sharply.

Copper has taken its jolts over the last few years from competitive materials but it may soon recapture some of its lost markets.

Auto uses seem to have about stabilized, but electrical uses will continue to grow. Copper pipe and tubing for construction applications and tubing for use in power generation are the industry's fastest growing markets. Potential is particularly bright in DWV (drainage, waste, vent) tubing. Since its introduction several years ago, it has chalked up big sales gains each year. "If it weren't for the strikes, 1959 sales would have set another peak," says one copper industry source.

• **Strikes Hurt**—If there had been no strikes in steel and copper, 1959 would have been a good year for the industry. Sales were fat in the first half, due in part to heavy inventory buying as a hedge against a strike. Without a strike there would probably have been some letdown in second half sales as customers worked off inventory, says Robert G. Page, president of Phelps Dodge Corp. But now, sales figures for the last six months will be off sharply, says Mr. MacKenzie.

Provided there are no strikes, copper sales in 1960 will be the best in several years. U. S. consumption could easily go to 1,550,000 tons. Supply will be tight during the early part of the year, though; Mr. MacKenzie estimates shortages will last at least 90 days after the copper strike ends. His guess is that it will be six months before stocks are back to normal levels.

• **Harder Sell**—The industry was more lax in the past in promotion and new product development than some competing materials. Copper people are the first to admit it but they point out the situation is changing. More dollars are going into marketing research, promotion, heavier advertising budgets, and research and development. Many of the younger executives being pushed up the ladder are marketing men. One example of what's being done: CABRA plans to tag 40 million items within the next year with labels that read "Solid copper (or brass or bronze), made in U.S.A."

Top copper people think more such effort is needed. Says Mr. MacKenzie: "The industry recognizes it has to do a better development and promotion job, particularly in nonelectrical uses of copper. We need a vigorous, aggressive research and promotion program, probably on an industry-wide basis."

• **No. 1 Problem**—Of great concern to copper management at the moment is a problem that's not unique in U. S. industry today: How to solve the squeeze brought on by higher costs in the face of ever increasing pressures from labor for more money (see Clyde E. Weed's comments on Page 39). The situation is aggravated in copper as more and more mines are forced to work low grade ore. What's the solution?

Says Mr. Page: "We are making an effort to hold down our labor increases. Our industry is more aware than ever of the necessity for

Anaconda's Weed:

Phelps Dodge's Page:

Asarco's MacKenzie:

"Cost Reduction Through Mechanization"

EVERY copper producer in the U. S. is faced with the problem of higher mining and processing costs in the face of ever increasing pressures from labor for more money, says Clyde E. Weed, chairman, Anaconda Co. "The first thing that has to be done," he emphasizes, "is to increase mechanization."

• **Making Progress** — Large strides have already been made. Mr. Weed cites the example of the "Quantrol," a machine that assays ore continuously. "Formerly," says Mr. Weed, "we had to take an ore sample, dry it, crush it, and then assay it. That took time—one or two days. Now we can get an assay instantly. It saves us $835,000 a year."

As a further step toward mechanizing operations, Anaconda is experimenting with an electric truck to haul ore from the pits.

• **Labor Costs Spiral** — Yet costs continue to increase faster than productivity and the selling price of copper, says Mr. Weed. "Labor costs at our copper facilities in Montana are about four times higher than they were in 1939 and 1940, while the price of copper is only about twice what it was then."

Emphasizes the Anaconda chief: "By rights, productivity gains should be split four ways—part to the consumer in the form of lower prices, part to the worker in higher wages, part for better equipment, and part in dividends to stockholders.

"We are constantly working on the problems of reducing costs and increasing productivity. But there will be a day when companies can't stay ahead, if productivity gains are continually siphoned off by labor."

"Plenty of Copper"

"OVER THE NEXT four to five years, the scales of copper production will be tilted toward overabundance," believes Robert G. Page, president of Phelps Dodge Corp. As head of the nation's second largest domestic producer, Mr. Page sees Free World capacity staying about 10 per cent ahead of demand, assuming normal growth in consumption.

"Oversupply is a world problem. In the first eight months of this year, Free World production exceeded demand by an average of 20,000 tons a month. If the U. S. industry hadn't been shut down by strikes in the second quarter, curtailments would have been in order."

• **After Strikes, What?**—Mr. Page views the poststrike pattern like this: "It will take three to four weeks to fill the pipelines to our own plants, longer before we can begin to ship fabricated material to customers, and quite a while after that before effects of the strikes disappear. Then we'll see a fairly short period of stability before overproduction asserts itself again."

Over the long term, says Mr. Page, overproduction will bring some weakening in prices, some production curtailments.

• **Harder Sell**—"To help spur consumption of our mounting copper capacity, we'll see increased emphasis placed on promotion, marketing, and research and development," says Mr. Page. "Right now, I imagine the industry's research and advertising expenditures have doubled in the last five years.

"We'll also see a continuation of the trend toward more warehousing of copper and larger sales forces."

"Steady Growth in the '60s"

"WE BELIEVE Free World consumption of copper will increase 30 per cent in the coming decade," says John D. MacKenzie, chairman and president of American Smelting & Refining Co. "And that's a conservative estimate."

In ten years, from 1950 to 1959, explains Mr. MacKenzie, recorded Free World deliveries of copper to fabricators rose from 2,270,000 to 3,100,000 tons, an increase of 37 per cent. "If we would use the data of the last decade to project the growth of copper over the next ten years, we would come up with a figure of 4,512,000 tons as the probable Free World consumption in 1969, or a growth of 45 per cent."

• **Not That High**—"But we don't expect growth will be that great," says Mr. MacKenzie, Asarco's chief executive officer since 1958. "Instead we estimate U. S. consumption will rise 20 per cent in the next ten years to 1,778,000 tons, and foreign consumption will go up 40 per cent (or 4 per cent a year) to 2,265,000 tons." His projection for 1969: Free World consumption of 4,033,000 tons, a 30 per cent rise.

• **Faith in Future**—"We're sold on the idea copper has a good future," says Mr. MacKenzie. Proof: Asarco has poured millions of dollars into copper expansion in recent years, will have the mine capacity to produce well over 250,000 tons yearly by 1962.

• **What About '60?**—"Next year will be a good period for copper, assuming the labor situation improves," predicts Mr. MacKenzie.

doing this, but how successful we will be is impossible to say now.

"Second, we will continue to install better equipment and better processes in our mines and plants.

"Third, if worst comes to worst, we will ask for a more adequate tax on imports."

• **Statistics**—It's difficult to analyze copper's statistical position this year because no one knows when the strike will end. Assuming that the copper strike will continue through yearend, the figures shape up like this: U. S. mine output of 815,000 tons vs. 980,000 tons last year. U. S. refined production of 1,175,000 tons compared with 1,446,540 tons in 1958. U. S. consumption of refined copper of 1,400,000 tons vs. 1,166,000 tons last year.

When you consider the bulk of the domestic industry has been closed down since mid-August, that gives you some idea of how good the first six months were. The fact that consumption will be up this year even though production is off can be blamed on high imports. They've spiraled since the strike began, hit 67,000 tons in September.

Next year, provided there's labor peace in copper and steel, look for: Mine output of 1,160,000 tons, refined production of 1,400,000 tons, and consumption (of refined copper) of 1,550,000 tons.

Steel Ponders Work Rules, USW Shifts to Nonsteel

THE UNITED STEELWORKERS is turning much of its attention temporarily to nonsteel contract situations.

Developments are brewing in copper (see Pages 37 and 130). Contract talks with aluminum and can companies will resume after Thanksgiving. Aluminum and can workers have remained on the job beyond contract expirations. Most of the copper workers have been on strike for three months.

All told, about 100,000 USW members are employed in those three industries.

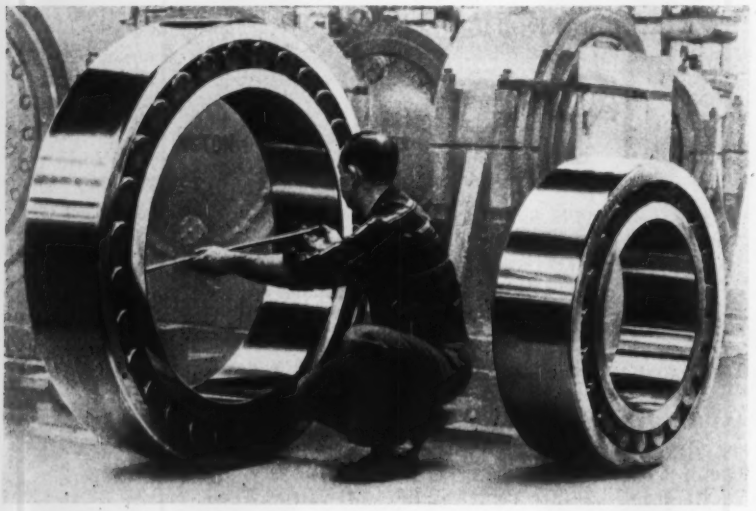
• **Stuck in Steel** — In steel, the union's 171-member Wage Policy Committee voted to renew the steel strike if no agreement is reached by Jan. 26 when the 80-day Taft-Hartley injunction ends. The committee didn't say what it would do if the majority of the union members vote to accept the steel companies' last offer. National Labor Relations Board will supervise the balloting by steelworkers to begin Jan. 6, if no settlement comes by then.

U. S. officials claim that union leaders are under no legal obligation to follow the will of the majority voting after Jan. 5 on the last offer. But they will be under strong moral pressure to do so. Fred Hartley Jr., co-author of the law and now a consultant, takes exception to the administration's view and says that Congress' intent was to make the vote legally, as well as morally, binding. Actually, T-H injunction voting procedures have never been truly tested. Past votes have been boycotted by union members, or back-to-work movement had already started during the election that obscured the results.

• **Settlement Prospects?**—Last week the outlook for the two sides coming to terms on the economic issues looked a little better. The hurdle remained work rules. The steel companies were rumored to be modifying their proposal on the matter. On Oct. 18 they offered to submit the question to binding arbitration. The new offer reportedly would submit it first to a union-management committee, then to arbitration if the committee could not agree. The October economic offer, on which the two sides aren't far apart, calls for a pact costing the companies 33 cents over three years.

• **Working Terms**—Steelworkers are operating under terms of the old contract, but two questions are in abeyance. When he granted the injunction, Judge Herbert Sorg "reserved" the questions of retroactivity and the cost of living increases. Both are subject to collective bargaining. If the negotiators can't reach agreement on those issues during the injunction, either side can go back to court, plead its case, and ask for a ruling.

The cost-of-living question will be hotly debated because it may mean 3 or 4 cents an hour. The index for Nov. 15 (to be announced on or about Dec. 22) will determine what adjustment could be made for the pay period beginning Jan. 4. Government economists say there's a chance the index could get high



SPHERICAL ROLLER BEARINGS support the rudder post of the nuclear powered **Long Beach**, first of the projected Navy task force of fast cruisers armed with electronically launched guided missiles. The larger bearing, 53.5433 in. in outside diameter, carries the radial load. The smaller, 38.5827 in. in outside diameter, carries the thrust end of the load. Both bearings operate submerged in oil. They were made in the South Bend, Ind., plant of Torrington Co.

enough to call for a 4-cents hike under the formula. The Bureau of Labor Statistics' consumer price index for Sept. 15 was 125.2, enough to provide 3 cents under the steel formula. The 17 cents in escalator boosts granted during the regular life of the 1956 contract will continue to be paid to steelworkers.

• **The Peak of the Pinch**—We're experiencing now the worst of the pinch from lack of steel. An estimated 450,000 to 500,000 are laid off among users of the metal, but the total should not rise much above the present level.

Steel plants are starting up fast and last week reached 79 per cent of capacity (Page 107). The recovery is as good as the most optimistic predicted but still at a slower rate than after the 1956 strike.

New Electric Power Concept Revealed

AVCO CORP. has been joined by ten leading power companies in a research project which could radically change the electric power industry.

The project involves the development of a new power system based on magnetohydrodynamics (MHD). It's a relatively new and unexplored area of science concerning the interaction of a magnetic field and hot ionized gas passing through it.

Dr. Arthur Kantrowitz, Avco vice president and director of the Avco-Everett Research Laboratory, says that more than 10,000 watts of power output have already been attained with a small experimental laboratory device using the MHD principle.

Successful development of the "hot gas" — magnetohydrodynamic —generator would eliminate much of the heavy and costly equipment of today's conventional system. Instead of requiring the solid core of wire (the armature) rotating through the magnetic field to generate the electricity, superheated ionized gas would do the same job. Components which might be eliminated include part of the boiler, steam piping, the steam turbine, steam condenser, and auxiliary equipment such as feed pumps.

Officials estimate that operating efficiency will be increased 25 per cent. Capital costs of an MHD plant, because of the simpler concept, will be competitive with those of conventional plants, they add.

Avco scientists began work on MHD in connection with space propulsion and re-entry problems. They gained sufficient knowledge of high temperature gas behavior to start work on the production of electrical power.

At present, two types of powerplants are being studied in connection with the MHD generator. One would use a coal-fired furnace to heat and ionize the gas entering the magnetic field. The other would use a nuclear reactor for the same purpose.

Dr. Kantrowitz further points out that the MHD research may open many new fields. "We're actually mating studies in two fields—gas dynamics and electromagnetic theory. There's a wealth of offspring possibilities including applications for space propulsion and eventually controlled nuclear fusion power."

The utility companies will be represented by American Electric Service, as agent.

Packaging Machines to Wrap Top Sales

WHAT WILL be the outstanding developments in packaging machinery between now and 1964?

Higher speeds and greater automation, agreed manufacturers at the Packaging Equipment Manufacturers Institute Show in New York last week.

Industry executives predicted greater sales growth in the coming decade than was experienced in the last ten years. Sales in 1960 are expected to spiral 27 per cent. This year and 1958 had been the best in the industry's history. Sales registered around $250 million each year.

• **Top Markets** — Pharmaceuticals, frozen foods, and cosmetics probably will pace the market in 1960. While consumer packaging continues to dominate the market, authorities look for the big percentage growth in industrial packaging. "Such packaging will soon be vying with Tiffany jewelry wrappings," claims one executive.

There are about 150 packaging machinery makers. The industry has many small producers which do an annual business of around $500,000. Larger firms account for $30 million to $40 million. Most orders are engineered to customer's needs.

• **Imports**—Like many other industries, packaging machinery is being hurt by imports.

Equipment made abroad undersells domestic equipment by 10 to 40 per cent and now accounts for 10 per cent of domestic sales (about $25 million annually).

"American producers just can't meet the price competition," deplores one company president, "because 60 per cent or better of our selling price is labor costs." High quality machinery is coming to the U. S. from England, France, Germany, Holland, Italy, Japan, and Sweden.

Consumer Buying: The Factors Involved

TODAY'S INDICATORS

1. Personal income is rising—4 out of 10 families have higher incomes than they did a year ago.
2. Consumer Attitude Index* is rising—it climbed from 91 in January, 1958, to 110 in June, 1959.
3. Durable goods spending was on the upswing before the strike. Once it is settled, expansion will continue.
4. Spending for nondurables and services continued to gain during the strike.
5. Reception of 1960 model cars has been enthusiastic.

WHAT BUYERS RESPOND TO

1. Income increases—both current and expected.
2. Economic news—local and national—concerning business expectations, layoffs, unemployment.
3. Prices—Advancing prices are generally resented and lead to unfavorable evaluation of buying conditions. However, resentment is weaker when accompanied by income increases.
4. Debt burden—credit availability facilitates but does not initiate a spending boom. However, families tend to maintain a fixed proportion of repayment obligations relative to income.

*University of Michigan index based upon consumers' buying intentions, personal financial situation, expectations of economic conditions, evaluation of marketing conditions.

Shopping Spree Ahead?

LOOK FOR the consumer to set spending records for cars, refrigerators, and other durable goods next year, say economists at the University of Michigan.

The durable goods spending spree, which was just gathering steam when steel labor struck, should bring an outlay of $45 billion while consumer income after taxes hits an annual rate of $350 billion, says Prof. Thomas G. Gies. He says two factors, consumer income and greater consumer confidence in the general economic climate, will bring the boom.

New loans and other types of consumer credit, tied to the splurge, will hit a rate of $4.2 billion per month and total more than $50 billion for the year, predicts Mr. Gies. Production of goods and services for the boom should start expanding with the end of the steel strike, he says.

• Consumer attitudes, prime mover of the boom, are more optimistic than they've been since 1956.

Dr. Eva L. Mueller, assistant program director of the university's Survey Research Center, points out that consumer spending is sparked by current increases in income and expected increases. "A boom in consumer spending may occur early in the recovery phase of a cycle, based in part on expected rather than realized income increases," she says. "The initiating factor is the optimistic notion that an improvement in the family's financial situation lies ahead and that it can afford to upgrade its possessions."

But, Dr. Mueller points out, next year's spending boom will not be a repeat of the all-out buying jag of 1954-55 which eventually resulted in last year's recession. During the past year, she explains, consumers spent much more conservatively in relation to income than they did during the same phase of the 1954-55 recovery. "If consumers had spent in anticipation of income increases, as they did in 1954-55, the steel strike might have ended the expansion," she says. Instead, consumers did not become more optimistic this year until after they had experienced an increase in income.

"In the second quarter of 1959, 13.2 per cent of disposable income was spent on durable goods compared with 14.9 per cent in the third quarter, 1955," she says. In addition, disposable personal income was 21 per cent higher in the 1959 period, but durable goods spending by consumers was only 9 per cent higher.

• More evidence of the boom is in the stepped-up spending for nondurable goods and services in recent months and the "enthusiastic reception" given 1960 model autos.

While layoffs resulting from the steel strike have spread through other segments of the economy, Dr. Mueller says, previous studies by the research center show that financial reverses which appear to be temporary do not lead to substantial reductions in consumer spending, even on major items.

Consumer attitudes toward prices probably will be a neutral force in the coming months, she adds. The proportion of people who expect price increases in the long run has risen from 17 per cent in 1951 to 47 per cent this year. And while inflation is still resented by most families, especially those with lower in-

comes, "most people think only of a creeping inflation—and a slow creep at that." Half of those who anticipate rising prices look for an increase of 5 per cent or less over the next five years, while about three-fourths think it will be 10 per cent or less.

• Financing will raise total consumer credit although the debt burden of the individual family will remain constant.

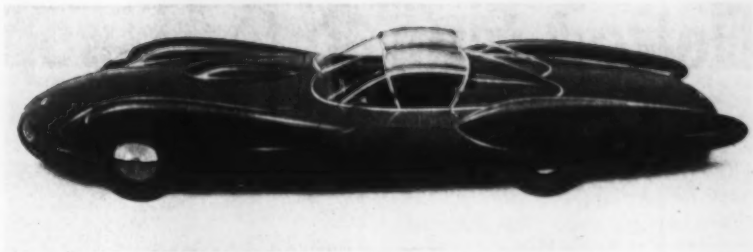
The proportion of spending units with large repayment obligations relative to disposable income was no larger in early 1959 than in early 1955. The percentage of families with monthly payments amounting to 20 per cent or more of disposable income was 12.8 per cent in both periods. Total consumer credit has expanded only slightly with increases in population and income. The percentage of spending units with installment debt was 44.1 per cent in early 1955 and 48 per cent in early 1959, says Dr. Mueller.

She also reports that spending expectations are not based on mere projections of the individual consumer's current conditions but on sound rational considerations. While they reflect the consumer's financial situation to some extent, they are also based on the individual's experience in prosperity and recession, on his information about the economic situation in his own locality and in the nation, and on his understanding of the role of government in controlling depressions.

Canadians Push Gas Use

Canada's natural gas industry is beginning a $2 billion program to supply fuel to more homes and industry. Compressor stations will be built in Ontario at Geraldton, Hearst, and Ignace, and north of Toronto. Distribution line expansion, new pipemaking plants, and a web of feeder and supply industries are planned. More than $1 million is earmarked for the development of a petrochemical industry in the west.

Most of the activity stems from the opening of a transcontinental pipeline, which began delivering western gas to Ontario and Quebec last year.



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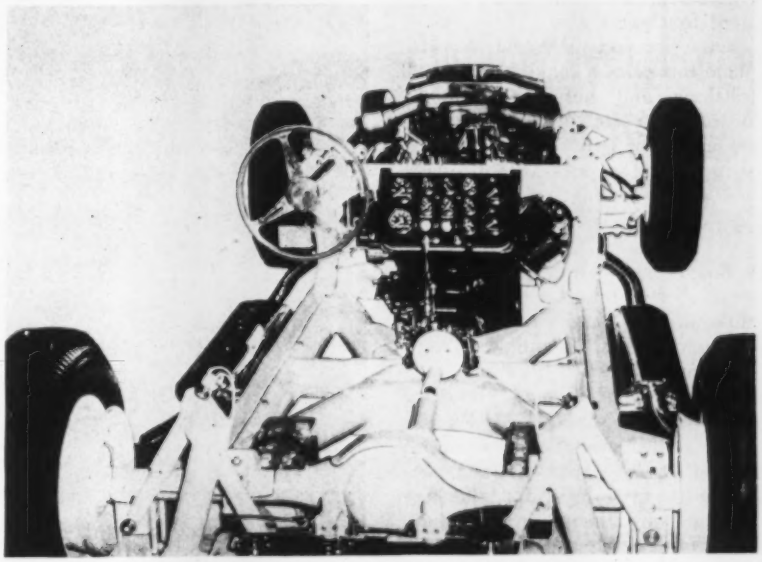


A chassis featuring an enameled, stainless steel frame

Argonaut's Smoke in Sight

THE SMOKE, first "motor machine" to be introduced by Argonaut Motor Machine Corp., Cleveland, will be available for purchase in April, In the works since 1956, the Argonaut (see STEEL, Nov. 3, 1958, p. 53) is described as a "permanent possession, utilizing the finest materials in each component of its mechanism."

The Smoke seats two, has a 126.5 in. wheelbase, and a total length of 236 in. Price: $26,000. Powered by an overhead valve V-8 engine, the machine can do "well over 200 mph on salt flats." Horsepower has not been disclosed.

The chassis, assembled in Cleveland, is guaranteed for four years. Bodywork, with the interior and equipment handcrafted to the owner's specifications, is done in the U. S. or Italy. Each vehicle is to be inspected semiannually by Argonaut engineers.

Servicing is available at the owner's residence.

Plush appointments include such options as air conditioning, a vanity, telephone, desk, secretarial and recording equipment, refrigerated food and beverage compartment, and a transcontinental portable radio.

Eventually, the company plans to produce seven models. Price range: $25,150 to $32,000. The largest will be the State Limousine which is 258 in. long and seats eight.

Detroit Firm Rides Europe's Boom

ARE YOU thinking about trying to crack foreign markets?

You may get some ideas from the experience of Acme Mfg. Co., Ferndale, Mich., which found that overseas operations were pretty much an uncharted field for smaller U. S. companies when it built its German plant four years ago.

Since the end of World War II, Acme has been a major supplier of polishing and buffing machinery to world markets. Although exports accounted for only 5 to 10 per cent of its annual business, it still qualified as the leading exporter of this type of equipment.

Acme Mfg.'s George and Glen Carlson find foreign markets come to them

• **Boom Starts**—But in 1954, this small slice of business took on new importance as European production of automobiles, appliances, and hardware started burgeoning.

Glen Carlson, Acme's president, tells what happened: "As demand grew, skilled wage rates went up and a severe labor shortage developed, particularly for the less popular jobs like paint polishing." Result: Germany, France, and England demanded automatic polishing and buffing equipment that would keep pace with its higher production rates. Although the equipment was more expensive than scarce hand labor, manufacturers could amortize it over long periods.

In 1955, Acme's exports jumped to 25 per cent of its total sales. "Instead of having to seek out new markets, they came to us," says George Carlson, vice president. The unexpected expansion brought new problems. European firms were buying virtually sight unseen. One company ordered $75,000 worth of finishing equipment on the basis of a catalog description. Accustomed to hand labor, finishers ran into trouble with automatic lines. Acme realized it needed a sales and service organization on the continent if it wanted to continue cashing in on this market.

At the same time, it discovered Europeans were buying one sample machine, then duplicating it to fill the rest of their needs. The Carlsons decided they needed overseas fabricating or assembly facilities.

• **Seeks Facilities**—"What we hoped to find was a small machine shop that could assemble components shipped from our Ferndale plant and also handle the service and training our customers needed," explains George Carlson. He went to Europe, but soon discovered such tieups were hard to establish. Lack of information about European needs plus inability to establish mutually satisfactory agreements with a couple of prospects washed out this project. "We finally decided that if we were going to do the job we might as well go all the way and build our own plant," he reports.

• **Opens Frankfurt Plant** — Acme Machine Co. (Acme Maschinenfabrik GmbH) was established as a wholly owned subsidiary. In January, 1956, it completed construction of a 20,000 sq ft building near Frankfurt, Germany. "We picked Frankfurt because it's only about 2 hours from any place in Europe," says George Carlson.

To run the plant, the Carlsons knew they'd need someone who was familiar with U. S. manufacturing and finishing techniques, yet was accustomed to European business methods. They found such a person in Jess Jessen. A former Luftwaffe pilot, Mr. Jessen became a naturalized citizen after World War II. He gained manufacturing experience in

Detroit's auto industry. The Carlsons hired him, briefed him on Acme's products and techniques, and sent him back to Germany as plant manager.

• **Business Grows** — Initially, the German plant assembled components shipped in from Detroit. But as orders came in, the subsidiary began fabricating more of its own parts and jobbing out components to shops in the Frankfurt area. Today, 50 per cent of the equipment it sells is built in Germany. Acme (U. S.) exports the rest of the components and fills special orders where it isn't practical for the German plant to do so.

The Carlsons claim language barriers and lack of European business knowhow were their chief hurdles. At one time, the subsidiary owed $250,000 to German banks, but the company repaid that in two years. In the last year, the subsidiary's sales have increased 50 per cent over those in 1958 (they've tripled since the first year of operation). At the same time, Acme's export volume has been maintained at 25 per cent of total sales. The Ferndale firm has invested some $600,000 in its subsidiary operation.

• **Gains Experience**—"Now it's getting to the point where the boys over there are coming up with ideas of their own. They have a tremendous desire for quality and pride of workmanship that we can't begin to match over here," exclaims Glen Carlson. As an example, the subsidiary is patenting an applicator for polishing compounds. "We've never been able to do it here because with our labor rates it's been cheaper for us to buy applicators from suppliers specializing in this item." But the German company didn't have any local source so it had to come up with its own. "Now we'll be able to import it and use it on our equipment here," enthuses George Carlson.

The company plans to use its hard won knowledge. It's concluding a deal that will give it a manufacturing and sales outlet in England. "We probably never would have gotten into this business if the buyers hadn't come to us first. But now that we are in it, we're going to do the job right," declare the Carlsons.

Seaway Ports Race to Build

GREAT LAKES ports in the U. S. are already drumming up expansion plans to draw more St. Lawrence Seaway traffic next year.

Toledo, Ohio, and Detroit port authorities are the latest to report their entries in the race for more salt water trade; additional facilities are already underway at Ashtabula, Ohio; Chicago, Milwaukee, Cleveland, and Buffalo (STEEL, Sept. 28, p. 92).

On election day, Toledo voters helped along a port improvement program by approving a $4.5 million bond issue and renewing the Toledo-Lucas County Port Authority's quarter-mill operating levy.

Passage of the bond issue will permit further development of 65 acres of waterfront property below bridges at the mouth of the Maumee River. Two companies, Toledo Overseas Terminals and Industrial Molasses Corp., Leonia, N. J., have already leased portions of the public site for wharves and storage facilities. Included in the public improvements will be filling and bulkheading to provide two additional cargo berths, new transit shed aprons, paved storage areas, and railroad tracks.

Of the Toledoans' seaport enthusiasm, one civic official remarked: "A word against the Port of Toledo would be like condemning hot apple pie and democracy."

• **In Detroit**—Mayor Louis C. Miriani says plans for an $8 million expansion of Detroit's private port facilities will be more than triple the city's dock capacity by the start of the 1960 navigation season.

In firm commitments made to the Mayor's Waterfront Development Committee, private interests plan to provide berths for ten large ocean-going vessels. (Detroit had three berths this year.)

As part of the expansion: Detroit Harbor Terminals Inc. will spend $4 million to increase dockage by 993 ft, permitting five large ships or eight small ones to dock at one time; Detroit Marine Terminals Inc. will spend $1.5 million to acquire 800 ft more land along the Rouge River and handle three large vessels at its docks; Todd Steel Corp. will enlarge its Detroit River frontage with an outlay of $2.5 million and will be able to handle five big ships by 1961.

With 2400 tons of steel products arriving weekly in 1959, Detroit's ship entries have been triple what they were in 1958.

Chicago Sees Boom Via Water Routes

ABOUT 38,000 employees will be added to industrial payrolls in metropolitan Chicago by 1965 as a direct result of St. Lawrence Seaway traffic.

• Total employment boost over 1957 levels will be 270,000.

• The Lake Michigan port will handle 6.2 million of the estimated 27.7 million new tonnage of industrially significant goods to come through the Welland Canal in 1965.

• Of the Chicago share, one-third (2 million tons) will be general cargo, a 600 per cent jump over the 1957 figure.

Those conclusions were drawn by the Chicago Association of Industry & Commerce from a study by the Geography Department, University of Illinois, Champaign, Ill., on the impact of the seaway on Chicago and Illinois Waterway associated areas.

The association points out that the generally ice-free waterway gives Chicago an advantage over other lake ports by providing year-around barge accessibility to the Gulf of Mexico. The waterway is being straightened and deepened to handle bigger tows and speed two way movement.

For the first time, the volume of waterborne traffic may provide enough effective competition for higher cost land transport media to induce freight rate reductions. The chief long range benefit of the water routes therefore may come indirectly as a result of favorable changes in the transportation cost structure of the region, the association surmises.

Can Representative Mills Lead the Way to . . .

Tax Reform in the '60s?

BILLED as the most extensive look at our taxation system in years, the House Ways & Means Committee's current public discussions with tax experts may be the opening scene in a drama designed to revamp the whole U. S. tax structure. Rep. Wilbur Mills (D., Ark.), chairman of the tax writing group, describes the sessions (which will run through Dec. 18) as preliminary to a "long, drawn out, painstaking study" (it might take years) which could go far beyond the hearings.

The discussions are planned to drum up support for Representative Mills's plans.

The young, southern legislator is attempting to confine the current discussions to the theory of taxation so a course can be charted which will meet competition from the USSR, provide for the population explosion which will give us another 20 million workers in the next 15 years, assure the needed capital for expansion of the economy, and recognize the growing trend of nationalism overseas. Revenues will have to stay high because federal expenditures will continue to grow, but the sources of revenue need reconsideration.

Experts Agree: Tax System Is Unfair

In the first week's panel, experts from universities, business, and labor established a common meeting ground: The present tax system is unfair.

Representative Mills noted that the experts had been selected to appear before the committee on the basis of their individual competency in the field, not as representatives of special groups.

Some disagreement on basic issues popped up: Prof. Stanley S. Surrey of Harvard University said that many special benefits have come about because at the time they were initiated, they were not considered too important. Over the years, he said, these single cases have snowballed into a tremendously complex, and sometimes unfair, system. John C. Davidson of the National Association of Manufacturers urged that high rates of taxation on the upper brackets be cut first. Later, he said, other revisions could be made.

All agreed that upper bracket rates must be cut. Peter Henle, AFL-CIO, added that he thinks rates must be cut in the lower brackets at the same time, and certain loopholes closed.

Representative Mills's final word on a tax cut: "We want to try to get the rates down."

Good Intentions, Unsatisfactory Results

Geoffrey J. Lanning, lecturer in law at Yale University, pointed out that much of the complexity and unfairness of the tax system had come from "judicial erosion" (court interpretations of law). He predicted a similar fate for current studies unless the fundamental principles of our tax theories are re-examined, and everyone recognizes the intimate connection between taxes and the political structure. He asserted that we are not operating in a free economy, but have a combination of old fashioned capitalism and the welfare state. He cited the legislative role of lobbies and administrative bottlenecks as factors not to be forgotten.

Prof. Joseph Sneed of the Cornell University Law School made a special plea for a tax system which would promote the free market concept, but admitted that he had little hope for significant change.

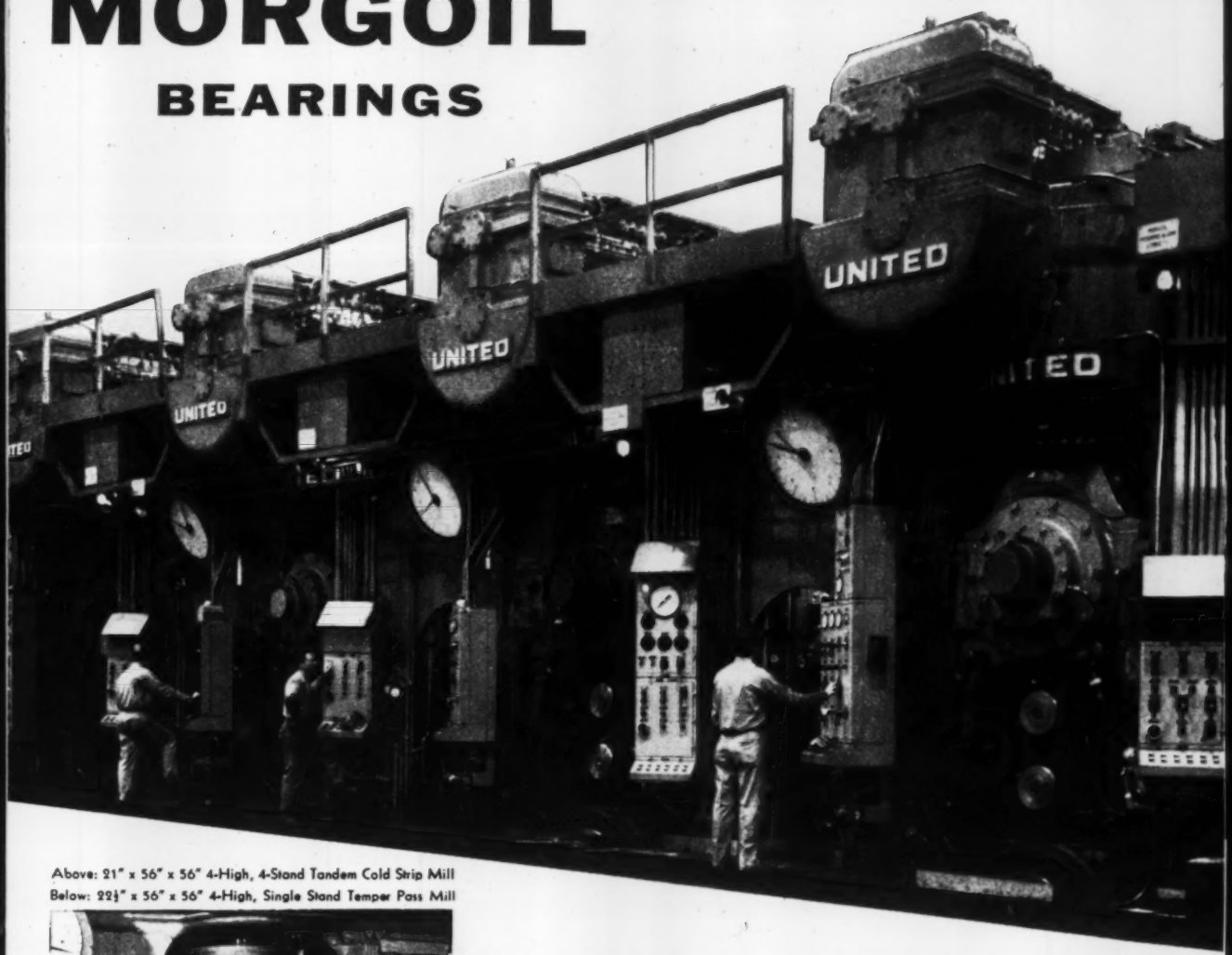
The University of Chicago's Prof. Walter J. Blum suggested that the loopholes existing in the tax laws are a direct result of the excessive rates on the high bracket income taxpayers. Loopholes are needed to prevent the high rates from becoming disastrous and jeopardizing economic growth, he contended.

Roswell Magill, president, Tax Foundation, called the system a hangover from World War II when we were trying to prevent accumulation of capital. Now, he said, $14,000 capital investment is needed to create every new job, so all rates must be reduced. He predicted that closing of loopholes would not solve the problem.

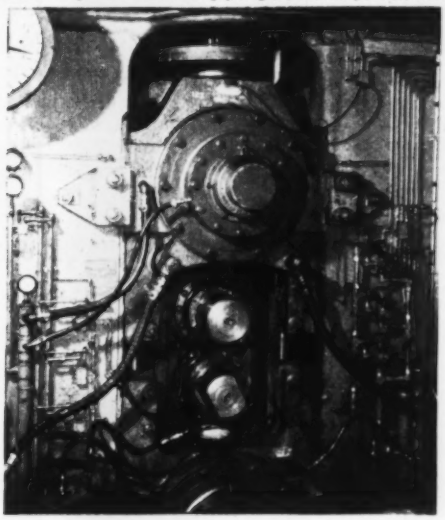
Herbert Stein, research director, Committee for Economic Development, said the present tax system is so complex it is as hard to lower taxes as it is to raise them. He suggested a tax cut as an antirecession measure would come too late to do any good. He advocated a tax system with "few rules," and one that would make no pretense of being fair to everyone. "Some unfairness is inevitable," he concluded.

Dean Neil H. Jacoby, University of California's School of Business Administration, envisioned the coming decade as requiring, among other things, 10 million new houses. Industry, to meet consumer demands and the tensions of the age, will have to be granted liberal depreciation allowances, he said, to keep up with the rapid pace of technological development.

MORGOIL
BEARINGS



Above: 21" x 56" x 56" 4-High, 4-Stand Tandem Cold Strip Mill
Below: 22½" x 56" x 56" 4-High, Single Stand Temper Pass Mill



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The demonstrated ability to meet high speeds, heavy loads and close tolerances made MORGOILS a natural choice for the back-up rolls on Inland Steel's new Cold Mills at the Indiana Harbor works.

Both the new 4-High, 4-Stand Tandem Cold Strip Mill and the new 4-High Single Stand Temper Pass Mill are equipped with 44"-90 MORGOIL BEARINGS.

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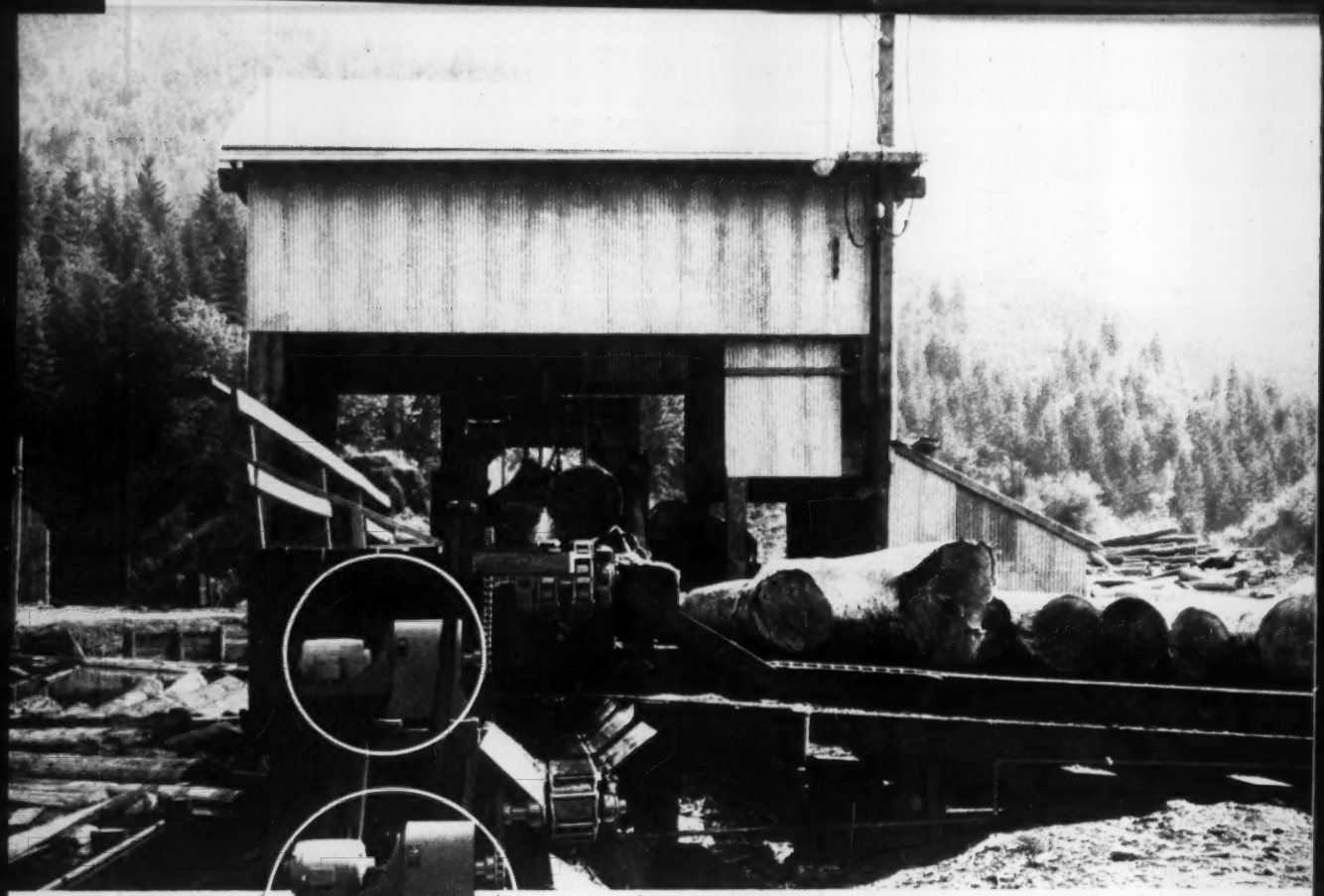

FALK Motoreducers driving log conveyor and refuse conveyor at the modern mill of The Bohemia Lumber Company, Culp Creek, Oregon.

FALK *all-steel* Motoreducers give you longer service life

Whether your load conditions are normal or heavy, the extra rigidity of all-steel construction (more than twice that of cast iron) maintains better alignment of revolving elements under load...a vital factor in prolonging the service life of gears and bearings.

And if your installations are subject to shock loads, or accidental external impacts, you're way ahead when you install Falk All-Steel Motoreducers. These rugged units do not destroy themselves by tearing off their feet under jamming overloads, nor are their housings subject to cracks which both dissipate the vital lubricant supply and allow revolving elements to get out of alignment.

All-steel construction is one of the built-in extras that you get in Falk Motoreducers. Others include: (1) 12 to 15% reserve load-carrying capacity in the gears (by AGMA standards), thanks to exclusive Falk extra-depth, high pressure angle helical gears; (2) maximum mechanical efficiency (98½% per gear mesh, under full load); (3) your choice of standard units (horizontal, vertical or right angle) to fit your precise requirements.

HORSEPOWER RANGE: to 75 hp . . . STANDARD OUTPUT SPEEDS: 780 rpm (high) to 1.2 rpm (low).

Prompt delivery from distributor stocks, or from warehouse or factory. Ask your Falk Representative or Authorized Falk Distributor for ***Bulletin 3100.***

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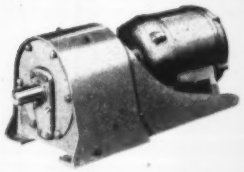
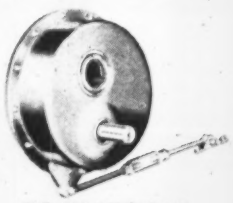


THE FALK ALL-MOTOR MOTOREDUCER
...the original All-Motor unit



THE ALL-STEEL FALK SHAFT MOUNTED DRIVE

Torque ratings to 41,000 lb-in at low speed shaft. Also available in flange-mount design.

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Vending Machines to Soar in '60s

AUTOMATIC VENDING is booming. About 150 vending machine manufacturers are benefiting. The industry has traditionally consisted of small businesses. But consolidation of manufacturers and operators should continue during the '60s. Such mergers will provide more solid financing and encourage research to develop new vending practices and equipment.

Vending equipment makers use substantial quantities of cold rolled sheets and strip, castings, gears, motors, electrical and electronic components, plastics, and fasteners. Supplies of steel are adequate until the end of the year.

• **Sales Up**—The trend to a shorter workweek and shorter store hours has necessitated unattended selling of a variety of goods and services. Well over $2.2 billion worth of coins will disappear down the slots of automatic dispensers this year, a 7 per cent gain over 1958. The number of machines will top 4 million for an 8 per cent increase.

• **What's Ahead**—Accelerated expansion is foreseen throughout the next decade. Machines of the '60s will be as different as today's equipment is from the simple models which launched automatic merchandising as a major marketing medium after World War I. Products and services available will run the gamut from refreshments, groceries, and small hardware to automatic laundries, newsstands, and insurance and ticket venders. By 1965, the value of vended merchandise is expected to reach $4 billion, 80 per cent higher than in 1959. Industry leaders point out that expansion will supplement, rather than replace, existing distribution methods.

Bill changers will conquer a major growth obstacle. Some changers are in use and others are about to appear, enabling multiple machines and product lines to be coupled to one unattended cash register.

• **Everything Grows** — This year, almost every facet of automatic merchandising has experienced upped sales. Significant advances were seen in food service for plants, offices, and schools. But the largest share of the industry's income comes from the sale of cigarets, coffee, and candy. The National Automatic Merchandising Association estimates 1959 cigaret sales will reach $840 million, soft drinks $633.2 million, candy $225 million, and coffee and other hot beverages $189.6 million.

The story of coffee and sandwich vending alone tells of the industry's increasing importance in refreshing the public. Coffee vending was introduced less than 15 years ago. In 1959, sales estimates distinguish between the three major methods of brewing a vended cup of coffee for the first time: Liquid concentrates, $61.2 million; dry ingredients or instant, $75.2 million; fresh brew (newest method), $53.2 million. Sandwich and pastry sales are anticipated to register $52.5 million this year, double the 1958 total.

MORE COINS CLICKING*

Year	Vending Sales	Machines in Use
1959	$2.2 billion	4.0 million
1958	2.1 "	3.7 "
1957	2.0 "	3.4 "
1956	1.8 "	3.2 "
1955	1.7 "	2.9 "
1954	1.5 "	2.8 "
1953	1.4 "	2.7 "

Source: National Automatic Merchandising Association.
*Machines for amusement or chance excluded.

HIGHER BONDING STRENGTH

WITH KAISER BASIC BRICK FOR THE STEEL INDUSTRY

Exceptionally high strength at critical intermediate temperatures (1400°F to 1850°F) . . . that's the unique advantage you get with Kaiser unburned brick!

When the internal temperature of bricks in a furnace structure reaches the point where the chemical bond is destroyed, brick strength reaches its lowest point and cracking and spalling losses may result. In the chart, note the high crushing strength after firing in the intermediate range. This denotes strong bond at all temperatures — a unique feature of Kaiser unburned bricks.

The Difference: Solid State Reaction

With Kaiser brick, there is no "liquid phase" in the formation of the ceramic bond. Kaiser's use of volatized silica (particles as fine as cigarette smoke) promotes a **solid state reaction** at lower temperatures which starts to form the ceramic bond **before** the chemical bond burns out. Result: **higher** bonding strength, **higher** resistance to thermal shock and mechanical abuse in furnace charging.

Solid state reaction also gives Kaiser brick outstanding resistance to distortion and shrinkage. Excellent resistance to chemical attack by furnace fumes, iron oxides and slags is assured by high MgO content, maximum brick density and chemically stable composition.

Make your own comparison tests and see how much more performance you get with Kaiser Basic Brick. And ask to see the new 30-minute color movie "Progress In Modern Basic Refractories." Your Kaiser Chemicals Sales Engineer or Regional Office will be glad to make the arrangements.

Call or write Kaiser Refractories & Chemicals Division, Dept. S9233, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below:

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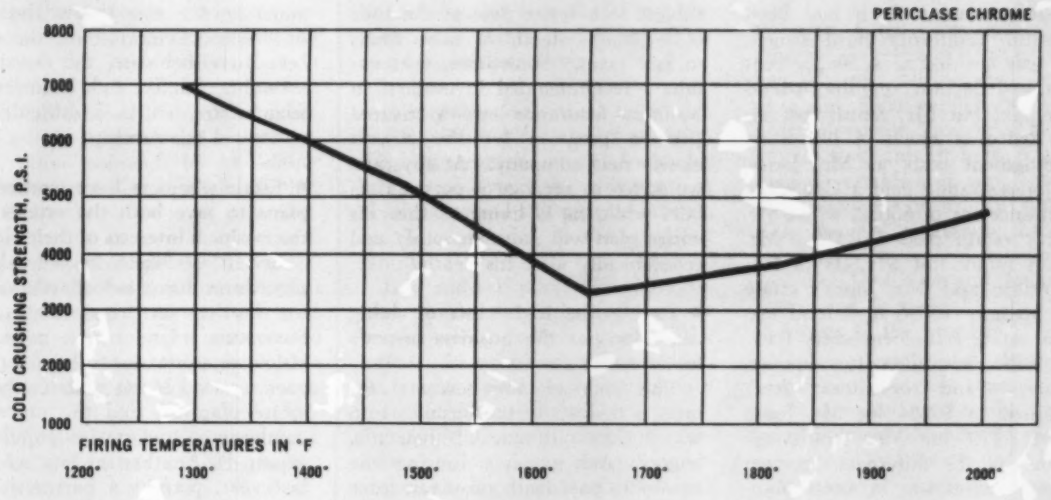

THE HIGH COST OF DYING

Mr. Smith		Mr. Jones	
Gross Estate	$270,490	Gross Estate	$282,102
Taxes & Costs . . .	36,332	Taxes & Costs . . .	18,492
Net Estate	$234,158	Net Estate	$263,610

The difference: Mr. Jones did a better job of estate planning.

Estate Plan Can Save Your Company

BUSINESSMEN, always concerned over the high cost of living, are becoming more and more concerned about the high cost of dying—particularly the effects of their deaths on their businesses and families.

In the summaries displayed above, Mr. Smith and Mr. Jones left similar gross estates. Both had been successful California businessmen; each was entitled to a 50 per cent marital deduction on his federal estate tax; but Mr. Smith lost almost twice as much of his estate to settlement costs as Mr. Jones. Mr. Jones's estate paid a California inheritance tax of $5632, while Mr. Smith's estate paid $12,150. Mr. Smith's estate lost $11,803 to federal estate tax; Mr. Jones's estate gave up only $6596 in federal tax. Other estate settlement costs (covering debts, administration expense, attorneys' and executors' fees) amounted to $6264 for Mr. Jones and $12,379 for Mr. Smith.

Much of the difference between the two estates was in estate planning, says Laurance W. McDougall, general agent for Mutual Benefit Life Insurance Co. of Newark, N. J., and past president of the Cleveland Estate Planning Council. Mapping out an estate plan which minimizes taxes is just one of the jobs done by the teams of lawyers, accountants, trust officers, and insurance underwriters who make up the council.

In addition, says Mr. McDougall, "We must see that an estate is not subject to a forced sale at the time of a client's death to raise funds to pay taxes. Sometimes, that entails a recommended investment in business insurance or an insured pension program for the client's closely held company. At any rate, we strive to arrange a person's affairs while he is living so that his entire plan will move smoothly and economically after his death."

• Paying the high costs of dying can wipe out the business owner's major estate asset.

The bulk of most owners' estates is tied up in the business into which they put most of their life, energy, and money. Raising the money to pay death taxes can force a sacrifice sale of the business and still leave the survivors little or nothing. (In the case of a Michigan contractor, the gross estate of $554,742 was subject to federal taxes of $122,228 and total settlement costs of $178,957. Liquid assets in the estate included only $14,000 in cash and $25,000 in life insurance.)

Where the business involved is a partnership, the firm is dissolved upon the death of a partner; where it is a corporation, death of the major owner can throw the controlling stock interest on the market. In either case, the decedent's surviving family and business associates are left in a difficult and unwanted relationship.

• Estate planners have worked out plans to save both the estates and the business interests of their clients.

Recent revisions in federal tax procedures have helped relieve the tax burden on some estates and businesses. Under one new provision, estate taxes can be amortized over a period of ten years (although estate planners find the procedure cumbersome and not as popular as expected). Another tax law, adopted last year, permits a partnership to incorporate, as a step toward reducing individual liability, while continuing to pay taxes as a partnership. That arrangement, how-

With a sound estate plan, you can . . .

CONTROL the profitable liquidation of business assets after death.

PROVIDE for continued operation of your firm, income for your family.

ARRANGE for surviving partners to buy out your interest at a fair price.

GUARANTEE your son's succession into your business when he's ready.

INSURE that your estate taxes will be paid without sacrifice.

ever, is allowed only under certain circumstances, approved by the government.

• A purchase and sale agreement, incorporated into an estate plan, is the most popular method among estate planners for handling business interests of owner-clients.

"Buy and sell" plans can take the form of either an option contract or an absolute selling agreement in which a stated percentage of the decedent's interest will be bought, at his death, by an associate or a key employee. Biggest advantage of the plan is that it sets a dollar valuation on the stock, or a formula for determining it, in the contract. A tax commissioner, or court, will usually not question the valuation set out in a valid buy and sell plan; in estates where an interest is evaluated without a sale agreement, tax authorities often contend for a higher valuation and accompanying higher tax.

To qualify as a valid agreement, and a proper valuation of the interest involved, the buy and sell plan must be made in good faith and must be drawn by an attorney so as to square with the applicable state and federal rules and statutes.

• Here is what the business owner can do with a buy and sell plan in his estate:

• He can provide for the continued operation of the business, and income for his family, by executing a sale plan with a valued employee to transfer less than a controlling interest to the employee, who will then remain and direct the business.

• An agreement between partners can provide that surviving partners will buy out a decedent's interest at a price fair to the dead partner's wife and family.

• A father can provide for his minor son's succession in the firm by selling the father's interest to an associate or key employee who will later convey the interest to the son. The best interests of the associates and the business can be protected by requiring that the son be satisfactorily employed by the firm for a stated period before he can become successor.

• A corporation stockholder can make provision for the corporation to buy enough stock from his estate to cover the payment of death taxes and still provide income, on the remainder, to the surviving family.

Buy and sell plans like those are often funded through life insurance on the selling party, payable to the buyer. In a case where stock is to be bought back later, a testimentary trust can be established.

Mr. McDougall cautions that estate plans and buy and sell agreements are legal transactions which must be carried out by an attorney who is familiar with all the circumstances of the individual client or company.

Jobless Pay: Should U. S. Take It Over?

THE establishment of minimum federal standards for unemployment insurance has been recommended by Prof. Wilbur J. Cohen, School of Social Work, University of Michigan.

In testimony prepared for the Special Senate Committee on Unemployment Problems, Professor Cohen urged Congress to enact six measures:

1. Establish a nationwide "reinsurance fund" to equalize the heavy costs of unemployment insurance in states which experience severe or prolonged unemployment.

2. Set a minimum number of weeks for which unemployment benefits would be paid to jobless persons who have satisfactory employment records.

3. Set a minimum level of weekly benefits (preferably 50 per cent of normal earnings) for the majority of unemployed.

4. Broaden unemployment insurance coverage. (It now covers seven out of ten workers.)

5. Establish a federally financed, state administered system of Supplemental Unemployment Benefits for the long term jobless.

6. Provide federal grants to states for general assistance.

• Excess Cited—The federal government, Professor Cohen noted, has already collected an "excess" of about $750 million under the Unemployment Tax Act. He suggested that this money could be used to establish a supplementary unemployment insurance program. (The "excess" represents the difference between federal revenues received under the act and the amount distributed to states for administrative costs of the program.)

Congress might also consider the transfer of federal supervision of the unemployment insurance program from the Department of Labor to the Department of Health, Education & Welfare, making it part of a total insurance system rather than an element in labor-management relations, Professor Cohen said.

no need for Obsolescence

with **BULLARD**

VERTICAL TURRET LATHES

Model 75

In May, 1955, Hyster Company, Peoria, Illinois, installed a 36" Cut Master V.T.L., Model 75 and by the end of 1956 it was evident that due to increased requirements an automatically controlled machine was necessary. *Did this obsolete the Cut Master?* — No sir — it only meant adding a Man-Au-Trol Conversion Unit to Cut Master *right in their plant. And it was accomplished in only four days.* No need to obsolete Bullard Cut Master, Model 75 — just convert them.

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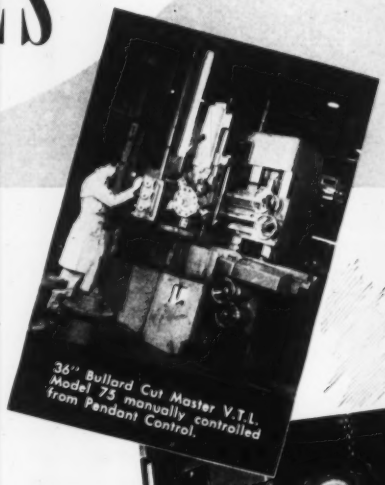
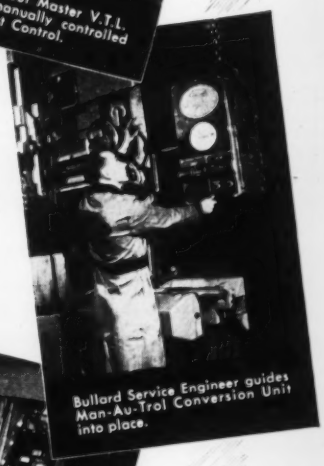
Man-Au-Trol installed for automatic control of Turret Head.



36" Bullard Cut Master V.T.L. Model 75 manually controlled from Pendant Control.



Bullard Service Engineer guides Man-Au-Trol Conversion Unit into place.

Electrical connections for Man-Au-Trol are wired into Cut Master Control Panel.

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BRIDGEPORT 9, CONNECTICUT

'Gatelining' Pays Off at Chrysler

GATELINING, a method of making car frames, works particularly well with unitized construction. That's why Chrysler Corp. is using it to build up bodies for all but its Imperial lines. The well known but little used technique was first tried by Chrysler on its 1957 Dodge line (see STEEL, Oct. 22, 1956, p. 59).

All side members and panels are placed in a single movable fixture —or gate—and welded together. The gates (one on each side) swing into the assembly line and are locked onto the moving truck which holds the body floor pan. Side panels are welded to the floor pan members; the gates are opened and returned to their starting point to be reloaded.

The more conventional method of building bodies is to assemble side members in a horizontal position, then fasten them onto the floor pan a section at a time. The approach makes for special fixturing and complicated material handling as different subassemblies are fabricated and brought into the line at different points.

• **Advantages** — Although gateline fixtures are more expensive than conventional body fixtures and bucks used for body and frame construction, they make for lower costs in the long run because the different parts and assemblies don't have to be moved from one location to another during fabrication.

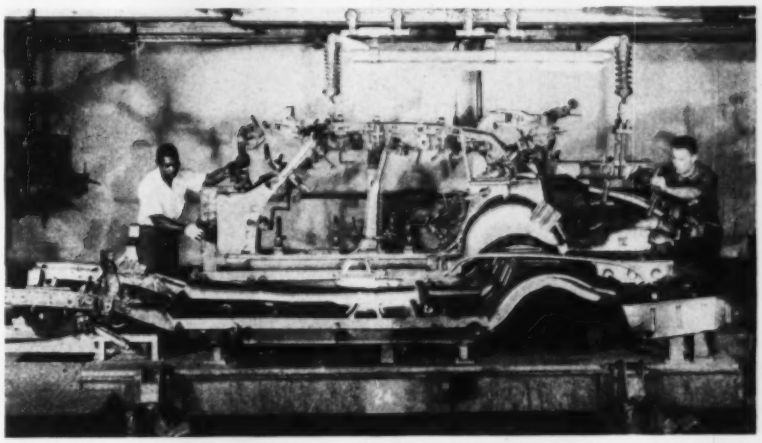
More important, better body fits are assured because each part goes in precisely the same location each time.

"This gives us positive control of all our body openings . . . a critical factor in reducing costs and maintaining quality," asserts Jack A. Fleming, manager of Valiant's body assembly.

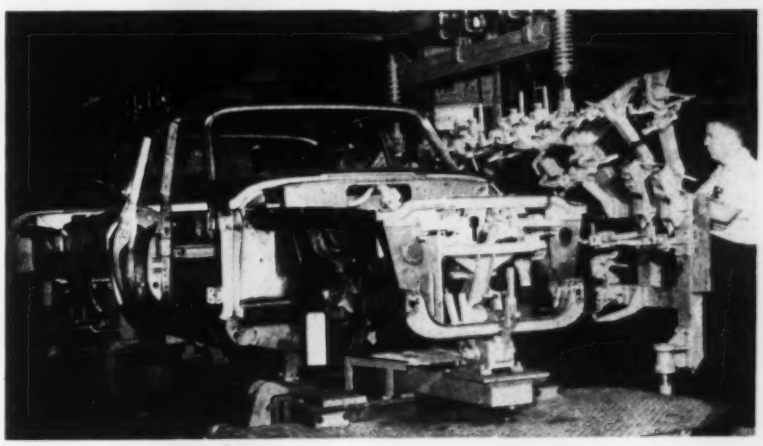
Savings in time and fewer rejects aid in keeping assembly costs down. Adds Mr. Fleming: "This type of building means we can more easily design bodies for simplified manufacturing instead of coming up with a particular type of design, then trying to figure out how to put it together."

A full gate is used in building Chrysler's economy car, the Valiant. Most of the subassemblies are fabricated in the Dodge Hamtramck, Mich., plant where Valiants are now built.

• **Welding**—Some 5200 welds go into the Valiant body—only 100 or 150 less than bigger Chrysler cars require. The body was designed to permit less expensive spotwelding; only a few arc and gas welds



Floor pan assemblies are loaded on dolly while empty side gates are readied for loading



Loaded side gates are swung in to the line and locked in place as floor pan and side members are welded at the framing station

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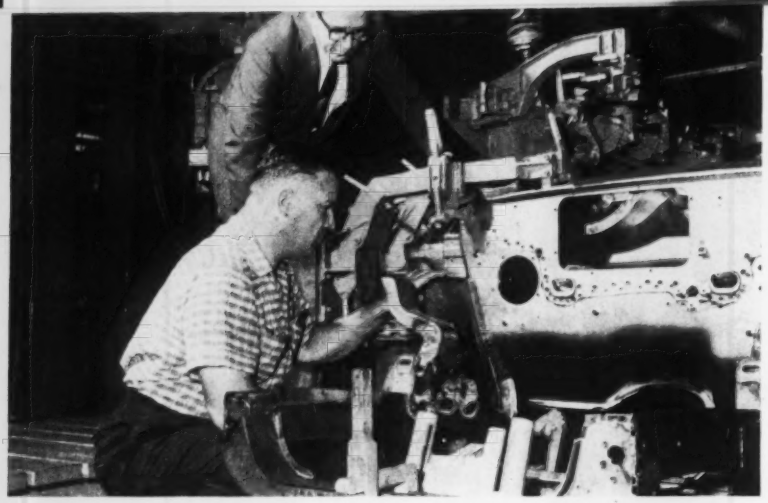


Jack Fleming double checks front end quality with foreman after the gates are removed

Hoods, decks, and doors are bolted to Valiant bodies as they leave solder finishing and proceed to paint preparation lines

are needed to fill holes and hard-to-reach corners.

When the body is ready for final finishing, small nonstructural parts like the rear stone shield and supporting brackets are welded in place. The front stone shield is bolted on later. Solder and solder finishing operations come next. Front fenders, hoods, decks, and doors are bolted on as the body leaves the solder finish booth.

• **Finish**—At this stage, the body is removed from the dolly on which it started its assembly trip. A traveling hoist lowers it to a paint dolly on the floor below. It runs through metal finish pickup, Bonderizing, and finally through Chrysler's 18 in. protective dip line which coats body members against corrosion. Painting and final assembly follow.

Unlike most carbuilders, Chrysler has not turned to galvanized steel for underbody components. It prefers the body dip which is similar to the process used by American Motors and Ford. Asked why, Mr. Fleming points out that welding galvanized steel is more difficult because the zinc burns off at weld points. While special equipment can weld galvanized, it can't be used with other types of steel.

Says Mr. Fleming: "At Chrysler, we're trying to standardize our production equipment as much as possible."

• **Future**—Right now Valiants are being built only at the Dodge plant in Hamtramck. Wagon production is just beginning. Chrysler plans to start Valiant production at its Newark, Del., plant early in January. Its St. Louis plant will start to assemble the compact car a month later. Chrysler hopes to fabricate subassemblies for all three production lines at a single location. By using the gating technique, it will be assured of maintaining constant quality on each assembly line.

Chrysler to Make Targets

Chrysler Corp. won a contract to provide modified Jupiter missiles for use as target missiles in the new Nike-Zeus antimissile missile program.

Selected because of its high degree accuracy and reliability, the modified Jupiter will have substantially the same exterior configuration as the present Jupiter.

Basic difference will be in the enclosed instrumentation.

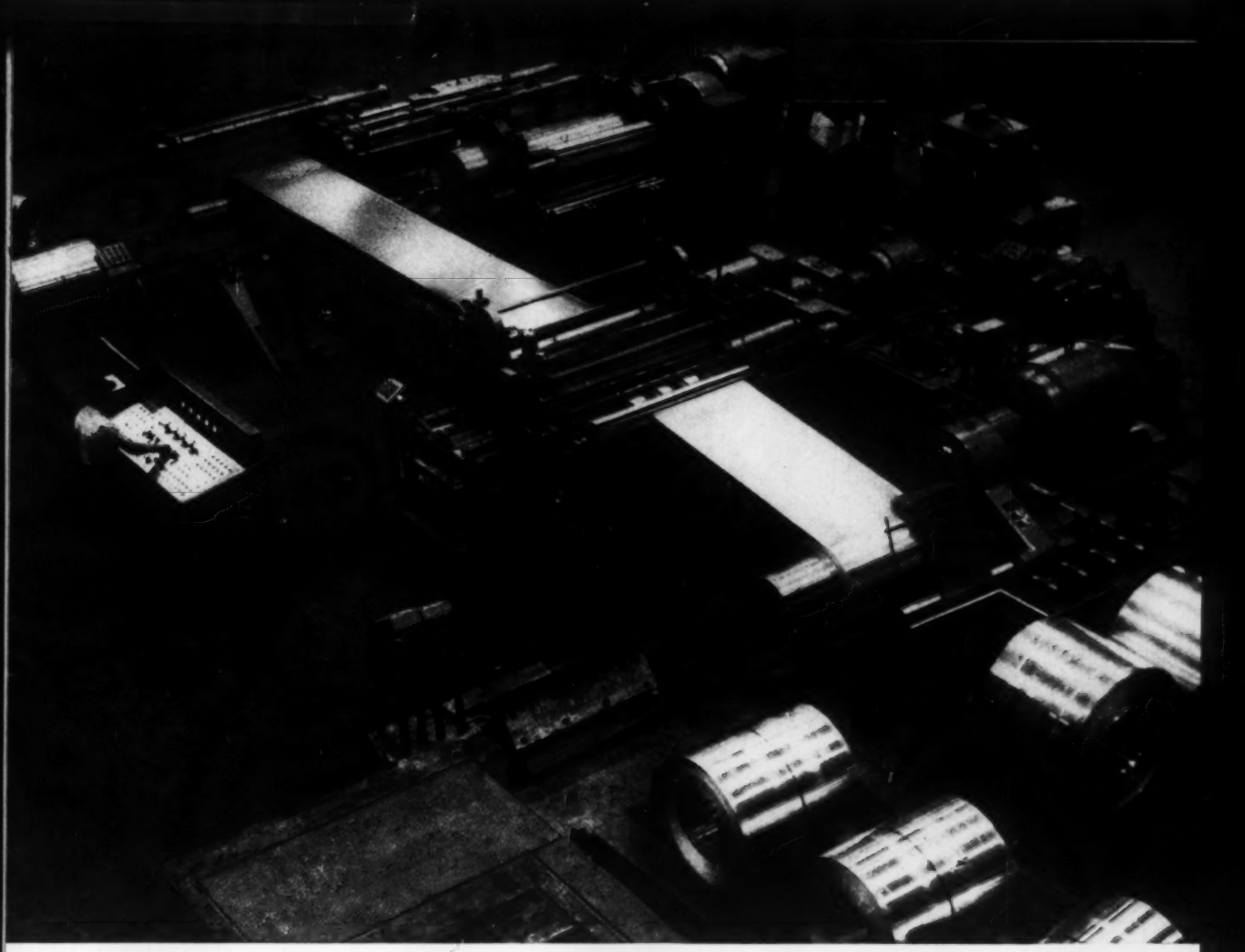
U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
10 Mo. Totals	4,844,219	3,135,973
November		514,152
December		593,920
Total		4,244,045

Week Ended	1959	1958
Oct. 17	133,480	45,387
Oct. 24	112,488	70,973
Oct. 31	101,616	97,804
Nov. 7	63,451	125,279
Nov. 14	64,668†	117,689
Nov. 21	60,000*	138,727

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



Anaconda Aluminum slits, side-trims, embosses sheet on one versatile Wean coil processing line

Unique versatility is the outstanding feature of this Wean light-gauge slitting and embossing line at Anaconda Aluminum Co.'s new fabricating plant at Terre Haute, Indiana. On this one compact line Anaconda Aluminum has the options of slitting and side-trimming, embossing, or side-trimming and embossing aluminum in widths to 60". As shown in the photo, the embossing stand is withdrawn when not in use.

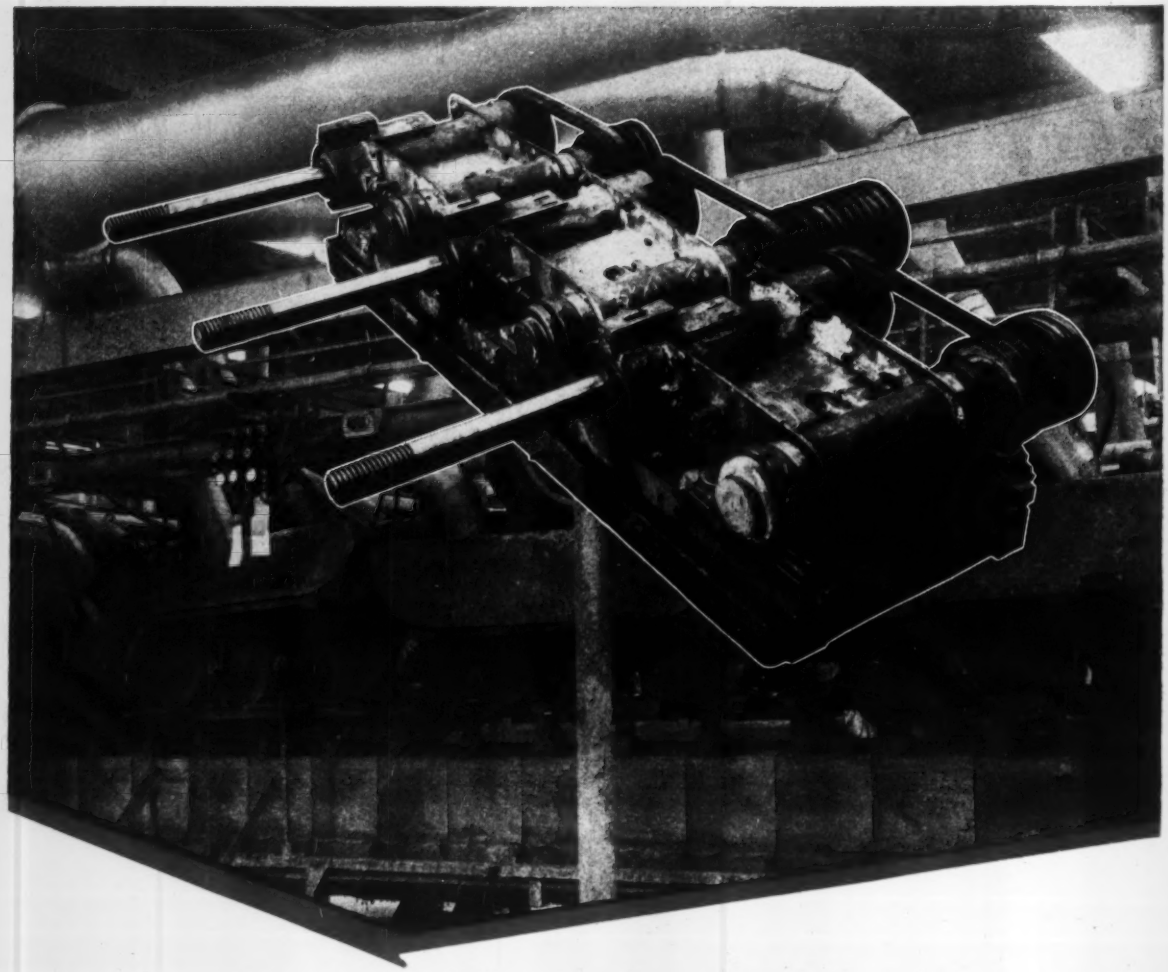
One of the special design features of this Wean coil processing line is a completely variable voltage system coupling all drive units. In combination with an electrical drag generator on the uncoiler, this control system gives uniform strip tension throughout all pre-set speed ranges. Line speeds vary up to 400 fpm on embossing and up to 1,000 fpm on slitting: gauges handled range from .008-.075".

Anaconda Aluminum Co. has two other Wean coil processing lines in this same plant: heavy-gauge slitting and shearing, and a "Flying Press" blanking line.

Coil processing of non-ferrous and ferrous metals is Wean's specialty. No matter what operation you need to perform on coiled metals, Wean's experience can help you do it faster, better and more economically. We'd like to have a chance to prove that statement on your next coil processing application.

WEAN

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO
Detroit • Chicago • Newark



Here's a Bearings, Inc. idea that saved our customer $3,000 in labor, maintenance and parts in 7 months

Only an authorized bearing distributor such as Bearings, Inc., with the experience and facilities we have at our disposal, could have designed and supplied the special housings that hold the flinger sealed bearings that now have effectively solved this difficult bearing maintenance problem.

A well known automotive stamping plant designed and built this tandem buffing head (shown above) for its own use. Due to the extremely high concentration of metal dust from the buffing and polishing wheels conventional bearings had a very short life. Over 300 bearings were purchased in 7 months. Downtime due to bearing failure was very costly. The actual labor and material cost of replacing the bearings during this period exceeded $3,000! Since the new bearing units designed by Bearings, Inc. (shown enlarged) were installed, no bearing failures have occurred and no replacements have been installed.

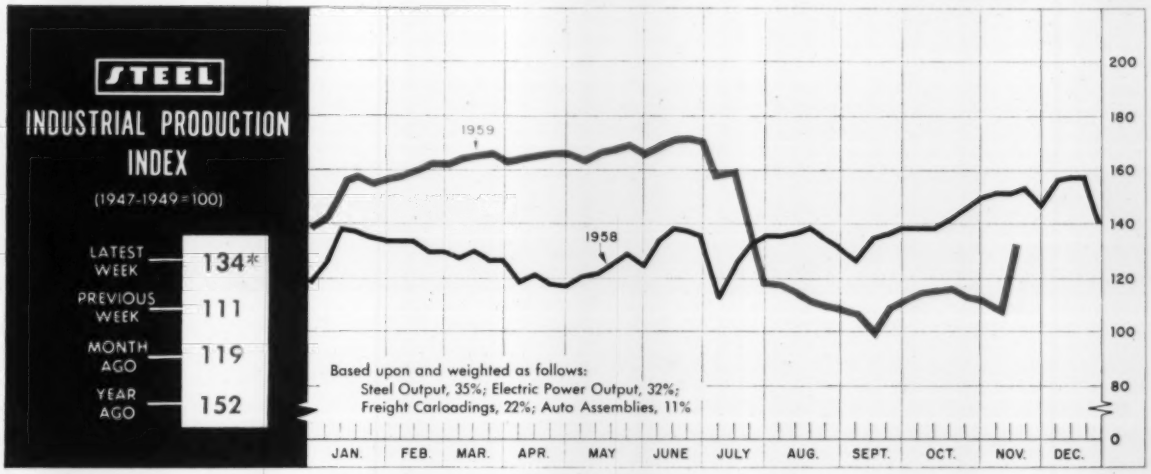
Remember Bearings, Inc. when you need replacement bearings — Get "factory fresh" bearings of latest design and manufacture. We are *authorized* to sell most famous makes of bearings. We sell *only* those we are authorized to distribute. Call the Bearings, Inc. branch nearest you!

Providing bearing service in the North ➤ **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden
NEW YORK: Balanrol Corp., Buffalo • Niagara Falls • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

and in the South ➤ **DIXIE BEARINGS, INC.**

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville
VIRGINIA: Richmond



*Week ended Nov. 14.

1960 Outlook Takes on New Glow

SENTIMENT for a robust 1960 is gaining acceptance among top ranking businessmen and economists.

As recently as a month ago, it was hard to find a prognostication favoring continued high activity throughout 1960. There was almost always some doubt about the second half, or at least the fourth quarter. Since then, the rush to join the "boom" bandwagon has been little short of a stampede. Big reason: Consumer confidence has held strong far after it was supposed to fade because of strike-induced belt tightening (see Page 42).

• **What They're Saying**—The pattern of the forecasts suggests to the casual observer that all the crystal balls are tuned to the same wave length. This is the message: A sharp upturn in the current quarter, bringing the economy almost back to the prestrike level, followed by a steep, steady climb to new highs during the first half. The rate of ascent will decline in the third quarter, followed by a leveling off in the final period of 1960. The length of the leveling off period varies from one quarter to a full year. The pattern in general resembles that of 1956-57.

Almost to a man, forecasters agree that the biggest weak spots in 1960 will be construction—specifically housing—and tight money, but neither will be sufficient to halt the over-all rise. In fact, many feel that the current money policy may keep the boom from getting out of hand.

• **NICB Version**—At the National Industrial Conference Board's recent business outlook session, Martin Gainsbrugh, the board's chief economist, declared that despite the dislocations of the steel strike, the continued strength of demand by consumers, industry, and government "lend little support to the thesis that a cyclical peak has been reached."

He pointed out that spending by

BAROMETERS OF BUSINESS

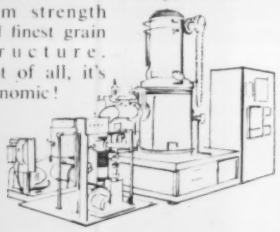
	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,237[1]	1,291	2,000
Electric Power Distributed (million kw-hr)	13,100[1]	13,019	12,378
Bituminous Coal Output (1,000 tons)	7,550[1]	8,065	8,859
Crude Oil Production (daily avg—1,000 bbl)	6,875[1]	6,899	6,968
Construction Volume (*ENR*—millions)	$444.3	$251.9	$374.3
Auto, Truck Output, U. S., Canada (*Ward's*)	81,208[1]	81,902	149,178
TRADE			
Freight Carloadings (1,000 Cars)	690[1]	561	644
Business Failures (Dun & Bradstreet)	265	273	331
Currency in Circulation (millions)[3]	$32,105	$31,920	$31,660
Dept. Store Sales (changes from year ago)[3]	+5%	+7%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,278	$24,541	$20,094
Federal Gross Debt (billions)	$291.0	$291.2	$280 2
Bond Volume, NYSE (millions)	$34.3	$26.2	$39.8
Stocks Sales, NYSE (thousands of shares)	16,195	13,884	20,790
Loans and Investments (billions)[4]	$105.2	$104.3	$93.9
U. S. Govt. Obligations Held (billions)[4]	$28.1	$28.2	$31.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	232.1	227.8	217.3
All Commodities[7]	119.2[1]	119.2	119 2
Commodities Other than Farm & Foods[7]	128.6[1]	128.6	126.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

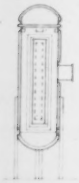
HOWARD GILBERT, Hayes Asst. Sales Mgr., tells about the . . .

"VACUUM AGE" OF HEAT TREATING

A major New York manufacturer of aircraft equipment recently reported their Hayes Vacu-Master Cold Wall Furnace was paying off in many ways — providing rapid cycling, simplified work handling, and complete production flexibility. Additionally, the vacuum furnace has eliminated need for atmosphere equipment . . . and produced work (stainless steel brazing) of maximum strength and finest grain structure. Best of all, it's economic!

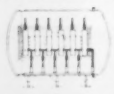


Similar Success Stories come to us from other users of Hayes Furnaces. Successful heat treating of "exotic" metals (tantalum, titanium, niobium, etc.) in the 2600 to 4500°F range. Successful sintering, hardening, annealing, and degassing at high production rates. Success stories all around!



The "Universal Atmosphere" has Universal Applications

Unlike other "atmospheres," vacuum has virtually no job limitations. Here's where the ingenuity of Hayes development engineers comes into play. By coordinating furnace design with job requirements . . . and by PROVING RESULTS in the Hayes lab . . . Hayes vacuum furnace engineers assure the customer a "RESULTS GUARANTEED" installation every time. I'd like to invite you to advance your heating into the "vacuum age" . . . with HAYES!



Write for vacuum Bulletin 5709A.

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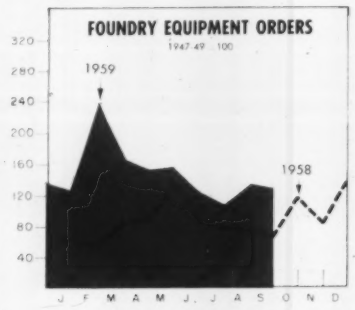
ELECTRIC VACUUM FURNACES

It Pays To See Hayes for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and liquid dryers.

THE BUSINESS TREND



	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	57.6	188.4
Mar.	166.6	85.9	127.0
Apr.	154.2	88.7	101.1
May	157.0	136.1	136.2
June	125.1	87.7	187.5
July	110.7	77.9	98.6
Aug.	134.1	74.1	231.3
Sept.	131.3	64.5	113.9
Oct.	....	118.9	145.3
Nov.	....	83.3	59.6
Dec.	....	137.0	61.4
Avg	....	89.1	130.7

Foundry Equipment Mfrs. Assn.
Charts copyright, 1959, STEEL.

	1959	1958	1957	1956
Jan.	115.84	93.07	126.34	122.43
Feb.	124.77	93.49	139.29	129.56
Mar.	146.36	97.89	140.76	166.14
Apr.	147.28	122.36	132.67	145.20
May	164.45	118.04	157.95	155.53
June	170 72	131.15	121.57	189.13
July	130.26	134.34	128.31	165.50
Aug.	87.02	104.46	110.09	168.70
Sept.	126.43	85.41	116.79	130.35
Oct.	....	111.35	124.80	143.38
Nov.	....	110.88	87.80	138.50
Dec.	....	105.97	105.65	117.76
Avg	....	109.87	124.34	147.68

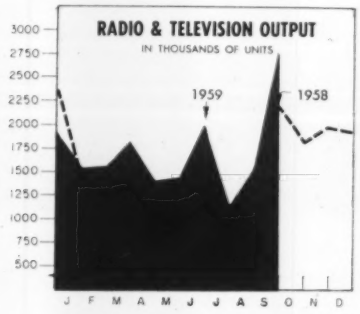
Material Handling Institute Inc.

all three groups in the third quarter was higher than in any previous quarter of this or any other year. "While deliveries of equipment and factory construction may be delayed in the current and subsequent quarters, business decisions already foreshadow a rise in capital outlays through most, if not all, of next year. . . . Once steel becomes more readily available, the prosperity phase of the present business cycle should again be resumed and may well be prolonged rather than foreshortened by the steel strike," he declared.

Arthur Rosenbaum, manager of economic research for Sears, Roebuck & Co., predicted that consumer income will be 5 to 6 per cent higher in 1960 than it was in 1959. Installment and mortgage debt will rise, and all segments of retail trade will grow, with the greatest gains in durable goods. He sees a price creep-up in services, construction, and commodities in 1960 because of rising costs of labor and materials. "However, a leveling off in many indexes can be anticipated before the end of 1960."

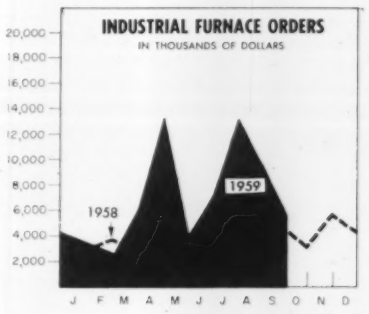
Saul B. Klaman, director of research for the National Association of Mutual Savings Banks, told the meeting that new mortgage lending for all purposes in 1959 will total about $20 billion, with new housing starts—both private and public—about equal to the record 1.4 million units in 1950. But increased competition for money and the reduction in savings during 1959 will cause a gradual falling off in housing starts for 1960. The total will be about 15 per cent under this year's figure, he predicted.

• **As Others See It**—Despite the steel strike, profits and dividends in 1959 probably will set records which will be broken in 1960, says the Prentice-Hall *Report on Business*. With the help of an all-time-high annual rate in the first half, before tax earnings this year will range between $46.5 billion and $49.0 billion (1955 record was $44.9 billion), and after tax profits will be between $24 billion and $25.1 billion (1956 record was $23.5 billion). "This is cold comfort, however, since total national product is now more than $80 billion above 1955's and more than $60 billion above 1956's," P-H laments. Next year, profits before taxes will be between $52.5 billion and $56 billion and after taxes about $26.8 billion to $28.6 billion.



	Radio		Television	
	1959	1958	1959	1958
Jan. ...	1,125	1,026	437	434
Feb. ...	1,125	877	459	370
Mar. ...	1,348	931	494	417
Apr. ...	1,040	630	389	303
May ...	1,040	655	432	267
June ...	1,430	774	571	337
July ...	829	593	350	275
Aug. ...	1,009	981	547	507
Sept. ...	1,981	1,493	808	622
Oct. ...	....	1,322	...	496
Nov. ...	....	1,546	...	438
Dec ...	....	1,526	...	415
Totals ..	....	12,481	...	4,921

Electronic Industries Association.



	1959	1958	1957
Jan.	3,518	3,047	8,775
Feb.	2,741	3,684	9,789
Mar.	6,146	2,871	10,485
Apr.	13,328	3,572	4,559
May	4,174	954	5,389
June	7,029	3,672	4,369
July	13,141	5,169	4,332
Aug.	9,738	3,533	3,924
Sept.	5,560	4,846	7,463
Oct.	....	3,105	3,674
Nov.	....	5,597	2,832
Dec.	....	4,284	3,992

Industrial Heating Equipment Assn. Inc.

Dividends this year will come close to $13 billion, slightly above 1957's record $12.5 billion and climb to $14.4 billion in 1960.

The Morgan Guaranty Trust Co. of New York sees the Federal Reserve Board's industrial production index heading for 150 (1947-49 = 100) by the end of this year, leaving it 5 points below the pre-strike level. And the bank feels that the gross national product in the fourth quarter will fall short of the $490 billion annual rate anticipated a short time ago. "But despite the severe losses due to the strike and the probability of a continuing impact for some time to come, there is still no reason to suspect that the economy is in danger of being propelled into a sustained cyclical decline."

● **Steelmaker's Views**—Economists for Republic Steel Corp. see the gross national product for 1960 shaping up this way (annual rates): First quarter, $507 billion; second quarter, $515 billion; third quarter, $518 billion; fourth quarter, $523 billion. The FRB index will register quarterly averages of 159, 163, 165, and 164, indicating that there will be a leveling off in the final period.

Looking Farther Ahead

A roller-coaster type trend was pictured for the National Electrical Manufacturers Association by Serge Klotz of the business consulting firm of MacKay-Shields Associates Inc. He sees a hard goods recession until steel supplies become adequate. But for 1960, he predicts a resumption of the business boom, led by the automobile industry and industrial equipment and with an assist from appliances. "The year 1961 will be a problem in many ways with a recession a likely development. However, the business horizon should brighten in 1962, and industry can look forward to the resumption of a bigger-than-ever boom in 1963. It will mark the beginning of the 'glorious' mid-sixties."

Dr. Pierre A. Rinfret, vice president and director of the economics department at Lionel D. Edie & Co. Inc., told NEMA that he sees a gain of 3.5 per cent a year for the American economy in the next decade. He considers the top ten growth industries for that period to be: Electric utilities, consumer boats, foreign travel, missiles, electronics, office equipment, housing, aluminum, plastics, and drugs.

■ On the front lines of atomic research, on the seaways and the airways, in the toughest of instrumentation's designing, TMI tubing is at work for the finest names* in metalworking. You have identified our special talents in precision drawing of small diameter tubing with successful solutions to the greatest challenges man dare's to give to tubing.

■ You have made it possible to identify the TMI trademark with the industrial giants, with the imaginative leaders of American industry, with the assembly lines that keep your reputations secure by building the best with the best.

■ To be in your company is to be on our technological toes day in and day out. You never let us relax but you do know how to win the enthusiastic cooperation of the entire TMI organization. That cooperation includes a sincere "Thank You" for letting us help you.

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Cold Drawn to small diameters: .050" to 1.250" with tolerances as close as ±.00025" when applications require them.

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Bridgeport (Montgomery County), Pa.

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Easier, faster, better, cheaper...4 reasons to use **SPEED GRIP**® Nut Retainers

Easier ... because anyone anywhere on the J. I. Case tractor production line can snap the spring steel retaining legs of the SPEED GRIP into punched panel holes. No special skill required. Hole alignment is no problem – the nut "floats" inside the cage to compensate for normal tolerances in the parts being assembled.

Faster ... no staking, no welding. No retapping of paint-clogged threads because SPEED GRIPS can be applied *after* painting. And they pop quickly and easily into position for final assembly.

Better ... heavy-duty SPEED GRIPS make possible sturdy, reliable attachments because both the cage and the nut are made of high quality steel. In case of accidental cross-threading, the SPEED GRIP can easily be replaced. You never have to "make do" with a sub-strength fastening.

Cheaper ... J. I. Case estimates a savings of about 30% per fastener over the previous method.

Want to achieve these benefits of SPEED NUT Brand Fasteners for your product? Refer to your Sweet's Product Design File, section 7-Ti, then call your Tinnerman representative (listed in most Yellow Pages under "Fasteners"). Or write to:

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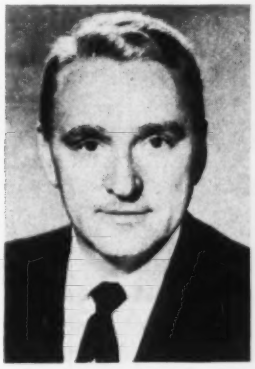
THOMAS J. READY JR.
Kaiser Aluminum & Chem. exec.



WALTER H. VENGHAUS
joins Narda Ultrasonics

ALBERT L. HUNT
Superior Foundry exec. v. p.

FRANK J. GENTILE
Youngstown Foundry chief eng.

Thomas J. Ready Jr. was named executive vice president, **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif., a newly created post. He was vice president and assistant general manager in charge of aluminum operations.

Walter H. Venghaus joined **Narda Ultrasonics Corp.**, Westbury, N. Y., as vice president and manager of manufacturing. He was with National Research Associates Inc.

Benjamin Friedland, assistant general manager, **Ozalid Div.**, General Aniline & Film Corp., New York, was made acting general manager following resignation of **Walter A. Hensel**, vice president of General Aniline & Film Corp. and general manager, Ozalid Div.

E. A. Zywiec was appointed chief engineer, **Michigan Seamless Tube Co.**, South Lyon, Mich., succeeding **L. E. Robinson**, retired. Mr. Robinson continues with Michigan Seamless and its subsidiary, Gulf States Tube Co., as a consultant.

Warren A. Brown succeeds **E. Roy Russell**, retired, as president of **Florence Pipe Foundry & Machine Co.**, Florence, N. J., and its subsidiary, **R. D. Wood Co.** Mr. Russell will serve as a consultant.

Joseph L. Lantz was promoted from sales manager to vice president-sales, **Goshen Rubber Co. Inc.**, Goshen, Ind. **David E. Williams** was made sales manager. **Carroll D. Hobson**, former chief engineer, was made assistant to the president; **Karl J. Dresler** chief engineer.

Albert L. Hunt was appointed executive vice president, **Superior Foundry Inc.**, Cleveland, and its **Allyne-Ryan Div.** He was vice president-operations at National Bearing Div., St. Louis, American Brake Shoe Co., with which he has been associated for 24 years.

Merle Kersten was appointed to the new post of manager, Steelform Dept., **Ceco Steel Products Corp.**, Chicago.

James W. McEwan was named assistant sales manager, **Elwell-Parker Electric Co.**, Cleveland.

Clarence H. Mingle, director of marketing, **Gates Rubber Co.**, Denver, was promoted to executive vice president-marketing.

A. D. Tracy was appointed purchasing agent, **Pittsburgh Forgings Co.**, Coraopolis, Pa., succeeding **C. F. Yoders**, retired.

James A. Carter was made assistant to the general plant superintendent of **Pitney-Bowes Inc.**, Stamford, Conn. He is succeeded by **Fred Nichols** as machine shop superintendent.

Dwight E. Lewis was promoted to general superintendent of **Chain Belt Co.'s** heavy machinery factory operations in Milwaukee, responsible for production in four plants.

Milo Miller, general manager-consumer products, **Permaglas Div.**, Kankakee, Ill., A. O. Smith Corp., was named an assistant vice president of the division.

Frank J. Gentile was made chief engineer, **Youngstown Foundry & Machine Co.**, Youngstown. He is succeeded as assistant chief engineer by **Joseph A. Becker**, formerly of Aetna-Standard Engineering Co. **Anthony P. Sgambati** was made project engineer. He was with Lombard Corp.

Karl W. Mueller was elected president, **Clinton Engines Corp.**, New York. He succeeds to the post vacated last August when **David B. Charnay** became chairman. Mr. Mueller was executive vice president, Crown Cork & Seal Co.

J. A. MacIntire Jr. was promoted to general sales manager, **Republic Rubber Div.**, Youngstown, Lee Rubber & Tire Corp. He succeeds the late **C. R. Conklin.** Mr. MacIntire was manager of wire braid hose sales.

W. Gordon Jarvis was made manager of quality control for **Hydreco Div.**, Kalamazoo, Mich., New York Air Brake Co. He was production control manager.

Frederick J. Pichard was made assistant director of marketing; **Donald A. Swardson** manager of abrasive and Long-Lyfe parts sales at **Wheelabrator Corp.**, Mishawaka, Ind.

J. R. Johnson joined **Royal Industries Inc.**, Beverly Hills, Calif., as executive vice president. He was senior vice president, Standard Coil Products of Chicago.

A. C. Moore was made general man-

J. D. McCALL

HARVEY B. JORDAN

United States Steel executive posts

LOREN H. BONNETT

WILLIAM C. PETERSEN

Hammond Valve vice presidents

ufacturing manager of **Ford Motor Co. of Canada Ltd.**

J. D. McCall, vice president-operations, was appointed president of **Columbia-Geneva Steel Div.**, San Francisco, **United States Steel Corp.** He succeeds Leslie B. Worthington, new U. S. Steel president. **Harvey B. Jordan**, executive vice president-production for U. S. Steel, Pittsburgh, was named executive vice president and chairman of the General Administration Committee.

- **Edwin H. Gott**, executive vice president-production, succeeds Mr. Jordan.
- **E. B. Speer**, administrative vice president-central operations (steel and coal), succeeds Mr. Gott.
- **R. W. Graham**, general manager-steel operations, succeeds Mr. Speer as vice president-steel operations.

Donald J. Murchie was made general sales manager, **Stulz-Sickles Co.**, Elizabeth, N. J.

Donald C. Ross was named purchasing agent for **Hickok Electrical Instrument Co.**, Cleveland. He served in a similar post for Gas Machinery Co.

Crawford E. Steiss was named vice president-sales, **L. J. Wing Mfg. Co.**, Linden, N. J., a division of Aero Supply Mfg. Co. Inc.

Harley W. McClure was made product manager, Boiler Products Dept., **American-Standard Industrial Div.**, Detroit, American Radiator & Standard Sanitary Corp. He was New England regional sales manager for the Industrial Div.

Richard S. Stonage was appointed product manager, welding wire and stainless wire, **Page Steel & Wire Div.**, Monessen, Pa., American Chain & Cable Co. Inc. He has been with the Page division since 1952, serving since 1958 as assistant district manager, Detroit.

Eugene W. Fuller was elected executive vice president, **Illinois Tool Works**, Chicago. He was vice president. **James R. Russell** was elected vice president-chief financial officer.

Hammond Valve Corp., Hammond, Ind., subsidiary of **Consolidated Diesel Electric Corp.**, appointed **Loren H. Bonnet** vice president-sales and **William C. Petersen** vice president-manufacturing.

Macauley Whiting was appointed general manager, Midland, Mich., Div., **Dow Chemical Co.** He succeeds the late **Dr. William H. Schuette**, vice president of Dow Chemical and general manager of the Midland Div.

Christian W. Marks was named assistant sales manager, **Republic Flow Meters Co.**, Chicago, subsidiary of Rockwell Mfg. Co.

Lawrence C. Gleason was elected president and general manager, **Gleason Works**, Rochester, N. Y. He has been president since 1958. **Howard F. Carver** (vice president) was made vice president-assistant general manager. **Dwight Vandevate**, former vice president-general manager, has resigned.

Frank T. House was made sales

DONALD C. ROSS

Hickok Electrical p. a.

RICHARD S. STONAGE

PS&W product manager

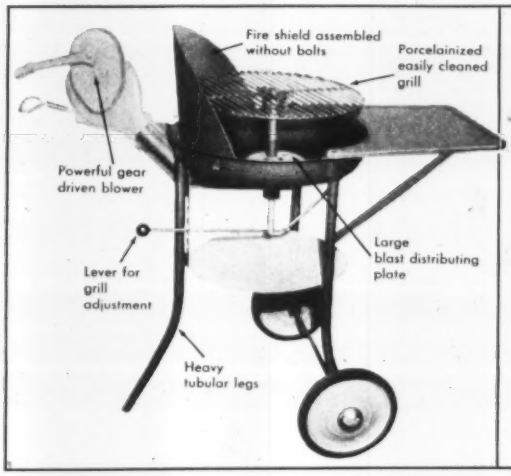
EUGENE W. FULLER

Illinois Tool Wks. exec. v. p.

LAWRENCE C. GLEASON

Gleason Works president

We made a last-minute change in our ad schedule to bring This Limited Special Offer to our industrial customers and friends.


Fire shield assembled without bolts
Porcelainized easily cleaned grill
Powerful gear driven blower
Lever for grill adjustment
Large blast distributing plate
Heavy tubular legs

"Buffalo" *Standard* Broil-Air

"Buffalo" *All-Seasons* Broil-Air

Powerful Blower Gives Quick, Easily-Controlled Heat.

Have an Indoor "Cook-Out" in Your Fireplace in Inclement Weather.

HERE'S YOUR CHANCE TO OWN THE BEST BROILER BUILT... *AT LOW DISCOUNT PRICES!*

▶ Ruggedly Built Like "Buffalo" Industrial Equipment ▶ Gears Protected by Dust-Proof Case

▶ Blower Gears are Sturdy Cut Steel ▶ Porcelainized Grill is Easy-to-Clean ▶ Heavy, 12 Gauge Steel Construction

▶ Entire Unit Designed for Years of Enjoyable, Trouble-Free Service

We at "Buffalo" had a specific goal in mind when we designed the superlative Broil-Air. Most previous grills were more of a nuisance than a pleasure to use. Starting the fire was a real problem. Even if you used plenty of newspapers and artificial stimulants, you were never sure you'd get a bed of glowing coals suitable for successful broiling. Once started, you had no control over the fire. Your coals were at the mercy of every whim of the wind. And if the wind died down, you were out of luck.

So we started "from scratch" to design a grill that would make outdoor cooking a real pleasure. "Buffalo" first made blacksmith's forges with crank-operated geared blowers over 82 years ago. We applied this same principle to our grill for charcoal broiling. The new Broil-Air was an immediate success. The outdoor cook became a "gourmet chef"... because with the Broil-Air he could control his broiling heat. The popularity of the Broil-Air has been proved by thousands of satisfied users.

"Buffalo" engineered the Broil-Air like its industrial equipment. Husky, heavy-gauge construction insures long, trouble-free life. The Broil-Air is designed for utmost convenience, portability and versatility. Ideal for family picnics, the "All-Seasons" Model can be quickly "knocked-down" for compact stowing... and reassembled without fuss or bother.

STANDARD BROIL-AIR

(Shown above.) Lightweight, easy-to-move, thanks to convenient handle and rubber-tired wheels. Lever quickly adjusts 18" porcelainized grill. $54.50 List

"ALL-SEASONS" BROIL-AIR

(Shown above.) Can be used anywhere, any time... even in fireplace. Specially-designed legs quickly fit under log basket or andirons. "Three-Point Stability" of legs assures level stance, even on irregular surface. $44.50 List

DE LUXE BROIL-AIR

Has basic features of Standard Model, plus porcelainized fire shield, fire pan and serving shelf. $64.50 List

SUPER BROIL-AIR

Extra-large 24" grill handles more servings. $65.00 List

NOTE: All prices are PRE-PAID — Shipped to address you specify.

SPECIAL DISCOUNTS SAVE YOU MONEY!

As a limited offer to our customers and friends, we offer the following discounts on all "Buffalo" Broil-Air Models:

1 Unit	10% Off List
5 Units	15% Off List
10 Units	20% Off List
25 Units	25% Off List

These discounts are especially attractive if you and your associates want to get together and order several Broil-Airs for yourselves and friends.

Ideal for Business Christmas Gifts! If you rush your order, we can still deliver Broil-Airs to the homes of your valued customers and business friends in time for Christmas.

But we urge you to order *now*. Remember, this is a limited-time offer to acquaint our industrial friends with the superiority of the "Buffalo" Broil-Air. Better take advantage of this offer while it still holds good! Use handy coupon below.

"Buffalo" ... with an 82 year old reputation for building the highest quality fans, blowers and exhausters of every type... air conditioning and air cleaning equipment... machine tools and pumps.

BUFFALO FORGE COMPANY 158 Mortimer Street, Buffalo, N. Y.

Enclosed is $_____ for:

☐ Standard Broil-Airs ☐ De Luxe Broil-Airs
☐ "All Seasons" Broil-Airs ☐ Super Broil-Airs

NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

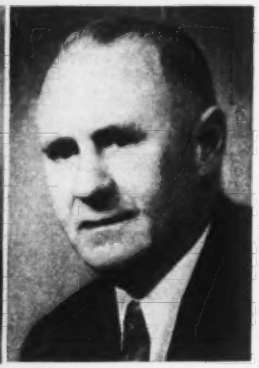
NOTE: If you wish Broil-Airs delivered to recipients' homes, please enclose list of names, addresses and models to be shipped.

KERMIT KUCK
Monarch executive v. p.

KENNETH S. CRAWFORD
Plymouth assembly plant mgr.

DEREK G. R. BRIGG
Heppenstall sales post

PHILIP T. COFFIN
Alcoa div. gen. mgr.



HAROLD E. ROWEN
McDowell vice president

DAVID E. SHONERD
Rocket Power v. p.-eng.

promotion manager for **Bucyrus-Erie Co.**, South Milwaukee, Wis.

Philip T. Coffin was appointed general manager of the new Structural Div. of **Aluminum Co. of America**, Pittsburgh. He was manager of electrical industry sales. **John R. Long** replaces **Russell G. Anderson**, retired, as chief test engineer, Cleveland Development Div.

Harold E. Rowen was elected a vice president of **McDowell Co. Inc.**, Cleveland. He has responsibility for the Dwight-Lloyd activities of the company.

C. R. Boyer was named manager, Light Metals Dept., Engineering Works Div., **Dravo Corp.**, Pittsburgh.

Graham Marks was elected executive vice president, **Caine Steel Co.**, Chicago. **William S. Harms**, a vice president, was appointed general manager, Chicago Div. **Walter P. Pasko** was made sales manager, metropolitan area, Chicago Div.

David E. Shonerd was appointed vice president-engineering, **Rocket Power Inc.**, Mesa, Ariz., division of Gabriel Co., Cleveland. He was assistant program director for Minuteman weapons system at Space Technology Laboratories.

W. W. Lowther was named director of research; **Donald W. Forsyth** chief engineer of United Specialties Div., **Industrial Enterprises Inc.**, Chicago.

Joseph L. Reeves was appointed assistant sales manager, **Atlas Chain & Mfg. Co.**, West Pittston, Pa.

Coldset Corp., Teterboro, N. J., appointed **Thomas L. McSwine** director of marketing, **Robert J. Mason** manager, Tool & Wheel Div., and **Royal G. Stookey** manager of manufacturing.

John A. MacLeod was named works manager of **Aluminum Co. of America's** utensil plant in Chillicothe, Ohio. He succeeds **Carl C. Yengling**, retired.

Kermit Kuck was promoted to executive vice president, **Monarch Machine Tool Co.**, Sidney, Ohio. He has been with the company 24 years. In 1947, he became vice president-engineering. Last year, his responsibilities were enlarged to include the Sales Div.

Kenneth S. Crawford was named manager, Detroit assembly plant, **Plymouth Div.**, Chrysler Corp., car and truck assembly operations. He succeeds **William C. Cawthon**, recently named general purchasing agent for Chrysler. Mr. Crawford was production manager at the plant.

Derek G. R. Brigg was made general sales manager, forging and die steel, for **Heppenstall Co.**, Pittsburgh, and its subsidiary, **Midvale-Heppenstall Co.**, Philadelphia. **Paul H. Daley** was made director of marketing and manager of export sales. **J. O. Phillips** and **A. T. Richter** were named assistant general sales managers.

John Geyer was promoted to technical assistant to the president of **Amchem Products Inc.**, Ambler, Pa. He was manager, Product Development Dept., Metalworking Chemicals Div., and is succeeded by **Hugh Gehman**, his assistant.

Robert G. Humphrey, New York district sales manager, was promoted to marketing manager of **Morris Machine Works**, Baldwinsville, N. Y. He is succeeded by **Ingemar Dalstad** in New York.

OBITUARIES...

Dr. William H. Schuette, 47, general manager, Midland, Mich., Div., **Dow Chemical Co.**, and a company vice president, died Nov. 8.

P. G. Harrison, 74, mining expert for **M. A. Hanna Co.**, Cleveland, died Nov. 11. He was ore sales manager when he retired in 1957.

James L. Hamilton Jr., western manager, **Mead-Morrison Div.**, Chicago, McKiernan-Terry Corp., died recently.

Howard L. McGregor, 72, chairman, **National Twist Drill & Tool Co.**, Rochester, Mich., died Nov. 12.

You'll agree our Sales-Technical service is tops among fuel oil suppliers

Our team of Sales and Technical people are fuel oil specialists. Our highly experienced staff can meet any fuel oil requirement, because our business is fuel oil alone.

Allied delivers the fuel oils you want, when you want them—in any quantity, by lake tanker, river barge, tank car or truck transport. Allied's efficient transport-and-storage system serves the heart of Industrial America, from the Mississippi to the Alleghenies—from Alabama to Canada. In this area, Allied can meet any fuel oil requirement. Write, wire or phone today!

ALLIED
FUEL OIL
SPECIALISTS

ALLIED OIL COMPANY
Division of Ashland Oil & Refining Company
CLEVELAND 13, OHIO / PRospect 1-3400

life-long beauty
with effortless cleaning—
means bright sales picture

UNILOY
STAINLESS STEELS

Treasured are the household items made of lustrous stainless steel. They shine *with a wipe* and keep their high quality appearance in everyday service... dishwasher detergents cannot mar their distinctive beauty. Markets for these items are ever-expanding, creating a brighter and brighter sales picture for manufacturers.

For Stainless Steel that provides ease of fabrication and fine finish—made to your exact specifications—specify Uniloy.

UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

Diversification Moves Made By Midland-Ross, Inland

Diversification continues to show up as a major objective in long range planning by many metalworking firms. A popular procedure is to acquire a well established company in the desired field of operation. Examples: Acquisition of Surface Combustion Corp., Toledo, Ohio, by Midland-Ross Corp., Cleveland, and the proposed acquisition of Allied Structural Steel Companies by Inland Steel Co., Chicago.

• **Midland-Ross**—The $23 million cash deal will give M-R a potential sales volume of about $120 million in 1960, predicts President Wade Harris. The corporation will now comprise 14 plants with 2 million sq ft of manufacturing space and employ nearly 6000.

Surface Combustion, which will be operated as a division under its present management and policies, is a leading producer of industrial furnaces. In addition, its organization includes two Janitrol divisions: The Heating & Air Conditioning Div. which serves residential, commercial, and industrial markets; and the Aircraft Div. which makes heat exchangers, heaters, pneumatic controls, and other items for aircraft and missiles.

• **Broadens Scope**—"Less than five years ago," Mr. Harris points out, "virtually 100 per cent of the sales of Midland Steel products were concentrated in the automotive field. We have no intention of relinquishing our strong position in this industry, but we feel our corporation will be strengthened by expanding into other growth industries."

The Surface Combustion acquisition will give Midland-Ross a broad base of operations with sales about equally divided between consumer durable and capital equipment markets. Less than 40 per cent of its sales will go into automotive fields. Other markets the firm serves include construction equipment, electronics, appliance, paper, plastics, textile, food and drug, chemical, rubber.

• **Inland Steel** — A proposal for purchase of Allied Structural Steel Companies by Inland will be considered for approval by the boards of directors as soon as legal considerations are resolved. Allied consists of three companies: Midland Structural Steel Co., Hammond, Ind.; Clinton Bridge Corp., Clinton, Iowa; and Gage Structural Steel Corp., Chicago. Structural steel fabricating plants are operated in those three cities and in Knoxville, Tenn.

Completion of the transaction would further broaden Inland's activities in the steel consuming industry. During 1958, its Container Div. placed in operation a pail plant at Jersey City, N. J., and its subsidiary, Inland Steel Products Co., purchased facilities to enter the steel building field on a substantially expanded scale.

The machinery and inventory of Gabriel Steel Co., Detroit, was moved last September to Milwaukee for continuation of the manufacture of Gabriel's metal building accessory products.

In early 1959, Inland acquired Pacific Metal Decking Co., Hayward, Calif., a manufacturer of roof deck, and also those assets of Steelcraft Mfg. Co., Cincinnati, used for the production of rigid frame metal buildings.

Will Build Two Gas Plants

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, will erect two plants for production of industrial gases at Fairfield, Ala. One air separation plant will be built to supply oxygen by pipeline to the Tennessee Coal & Iron Div., U. S. Steel Corp., for metallugical applications in the manufacture of steel as well as for general steel mill purposes. The other plant is being erected to serve customers in the Southeast. The new plants will have a daily production capacity of 145 tons of high purity industrial gases.

Opens Mississippi Foundry

Mississippi Malleable Iron Co., a subsidiary of Peoria Chain Co., Meridian, Miss., has started producing sprocket chains and light castings. Peoria Chain is a subsidiary of Peoria Malleable Castings Co., Peoria, Ill. Officers of the Mississippi foundry are: President, L. E. Roby; vice president and secretary, W. S. Roby; treasurer, J. J. Jacobs; and superintendent, Robert Mudd.

Trane to Build in Utah

Trane Co., La Crosse, Wis., will build at $1 million plant in Salt Lake City, Utah. It will contain about 60,000 sq ft plus warehouse facilities and should be in operation in about a year. It will be basically a sheet metal operation. "We expect to build commercial air conditioners, heating units, fans and ventilating equipment, and heat transfer coils," says D. C. Minard, president. "We also expect to do partial fabrication and final assembly of refrigeration compressors for big building air conditioning."

Launches Joint Venture

American Zinc, Lead & Smelting Co., St. Louis, and Hydrometals Inc., Chicago, are establishing a joint venture for the development and exploitation of the mineral resources and mining and milling facilities of the Peru Mining Co., Silver City, N. Mex., a subsidiary of Hydrometals. Peru Mining's properties, including a concentration plant at Deming, N. Mex., have not been operated for three years. The concentrates to be produced by the joint venture will be converted into slab zinc at the Dumas, Tex., smelter of American Zinc.

Under a separate agreement, the Monsanto, Ill., electrolytic plant of American Zinc will cast 8000 lb ingots of Hydrometals' new alloy of titanium copper and zinc. The ingots will move from Monsanto directly to the rolling and extrusion

mills of Dow Metal Products Co. at Madison, Ill., where they will be rolled into coils of sheet metal or be extruded.

NEW OFFICES

Eastern Stainless Steel Corp., Baltimore, established a district office at 4222 Richmond Ave., Houston 27, Tex. Leslie L. Lehman is district sales manager.

H. M. Harper Co., Morton Grove, Ill., opened a branch office at 109 Baker St., East Syracuse, N. Y. E. M. Welty is eastern regional manager; Dana Lincoln, district manager. The company produces corrosion resistant fasteners.

CONSOLIDATIONS

Minneapolis-Moline Co., Hopkins, Minn., acquired **Hymac Electronics Corp.**, Culver City, Calif., producer of electronic instrumentation and test equipment. Josh W. Gershuny has been named president of Hymac which will be operated as a subsidiary of Minneapolis-Moline.

Ekco Products Co., Chicago, will acquire **Washington Steel Products Co.**, Tacoma, Wash., subject to approval of stockholders.

Chain Belt Co., Milwaukee, acquired **Carrier Conveyor Corp.** and its subsidiary, **General Industries Inc.**, Louisville. The new properties will be operated as the Carrier Conveyor Div. of Chain Belt.

Owens-Illinois Glass Co., Toledo, Ohio, acquired **Keystone Brass Works**, Erie, Pa., maker of cast bronze solder fittings and plastic dinnerware.

Trans Continental Industries Inc., Roseville, Mich., will acquire **Republic Appliance Corp.**, Los Angeles, subject to approval of stockholders. Republic makes water heaters.

Electrosnap Corp., Chicago, will merge into **Controls Co. of America**, Schiller Park, Ill., subject to approval of stockholders. Electrosnap is a manufacturer of precision switches; Controls Co., electrical controls and control systems, electrical motors, and miniature electrical products.

United Marine Corp., Philadelphia, has taken over operation and control of **Richardson Boat Co. Inc.**, North Tonawanda, N. Y., and **Colonial Boat Works Inc.**, Millville, N. J. D. A. Beverage has been named assistant vice president-design and manufacturing; Kenneth Hamilton, assistant vice president-sales.

ASSOCIATIONS

National Foundry Association, Chicago, elected these officers: President, A. G. Hall, Nordberg Mfg. Co., Milwaukee; vice president, Charles Carolin, R. B. Carolin Foundry & Machine Co., Detroit; and treasurer, W. G. Greenlee, Greenlee Foundry Co., Chicago. New members of the administrative council are: D. E. Du Perow, Lincoln Brass Works, Detroit; F. T. O'Hare, O'Hare's Foundry Co., St. Louis; Robert Phelps Jr., Francis & Nygren Co., Chicago; T. H. Tanner, Zenith Foundry Co., Milwaukee; W. S. Thomas, Emmaus Foundry & Machine Co., Emmaus, Pa.; W. W. Thomas, Straight Line Foundry & Machine Corp., Syracuse, N. Y.; and C. H. Welch, Alloy Cast Steel Co., Marion, Ohio.

Caster & Floor Truck Manufacturers Association, Chicago, elected these officers: President, L. T. Williams, Bond Foundry & Machine Co., Manheim, Pa.; vice president, E. M. Heffernan, Jarvis & Jarvis Inc., Palmer, Mass.; and treasurer, D. B. Anderson, Nagel-Chase Mfg. Co., Chicago.

Service Tools Institute, New York, elected these officers: President, T. A. McMullen, Bingham-Herbrand Corp., a subsidiary of Van Norman Industries Inc., New Bedford, Mass.; and vice president, M. S. Bandoli, Pendleton Tool Industries Inc., Los Angeles.

NEW ADDRESSES

Electrolizing Co., Providence, R. I., moved its Los Angeles operations into a 40,000 sq ft plant at 1947 Hooper Ave., Los Angeles 11, Calif. Electrolizing is a proprietary vacuum plating process which deposits a high chromium alloy on the wear surfaces of metal parts.

C. K. Wall Co. opened new offices at 303 Claremont Ave., Montclair, N. J. The company specializes in custom engineered components for manufacturers of vacuum tubes, semiconductors, lamps, and high temperature furnaces.

Special Engineering Service Inc. moved to its new sales and engineering headquarters at 7630 Wyoming, Dearborn, Mich. The firm makes automation pressroom equipment and provides engineering and design services for the automotive, aircraft, and other industries.

Frederic B. Stevens Inc., a subsidiary of Udylite Corp., Detroit, moved its Indianapolis warehouse and office to 5345 Lexington Ave. Stevens produces foundry supplies and electroplating equipment and supplies.

Atlas Powder Co., Wilmington, Del., moved its San Francisco explosives and chemicals sales office to 2036 Pioneer Court, 20th Avenue Executive Center, San Mateo, Calif.

Janitrol Aircraft Div., Surface Combustion Corp., moved its branch office to 6214 W. Manchester Ave., Los Angeles 45, Calif.

NEW PLANTS

Waltham Precision Instrument Co., Waltham, Mass., bought an 18,000 sq ft manufacturing facility at Brookfield, Conn. The company makes gyroscopes and missile and aircraft instruments.

Linde Co., a division of Union Carbide Corp., New York, is operating a liquid hydrogen facility at its Tonawanda, N. Y., laboratories. The unit can produce more than 25,000 liters a month of liquid hydrogen with less than two parts per million impurities.

PERFORMANCE REPORT

R. J. Huff, Granite City maintenance superintendent, points out Morgoil bearings to J. H. Koester, Granite City lubrication engineer, and W. P. "Sandy" Wehking of Standard Oil.

How *STANOIL Industrial Oil has been delivering on 22-year assignment at Granite City Steel*

Situation: In 1937, Granite City Steel installed STANOIL Industrial Oil in the Morgoil Back-up Roll Bearings in the five-stand finishing train of their hot strip mill. Each bearing has a load-carrying capacity of more than three million pounds. The oil on which these bearings ride must be of high quality to meet the requirements of this severe service. A narrow viscosity range is required to assure proper operation of the mill throughout the speed range. More than 10,000 gallons of water per minute cool the work rolls. The oil thus must have superior demulsibility to prevent water contamination.

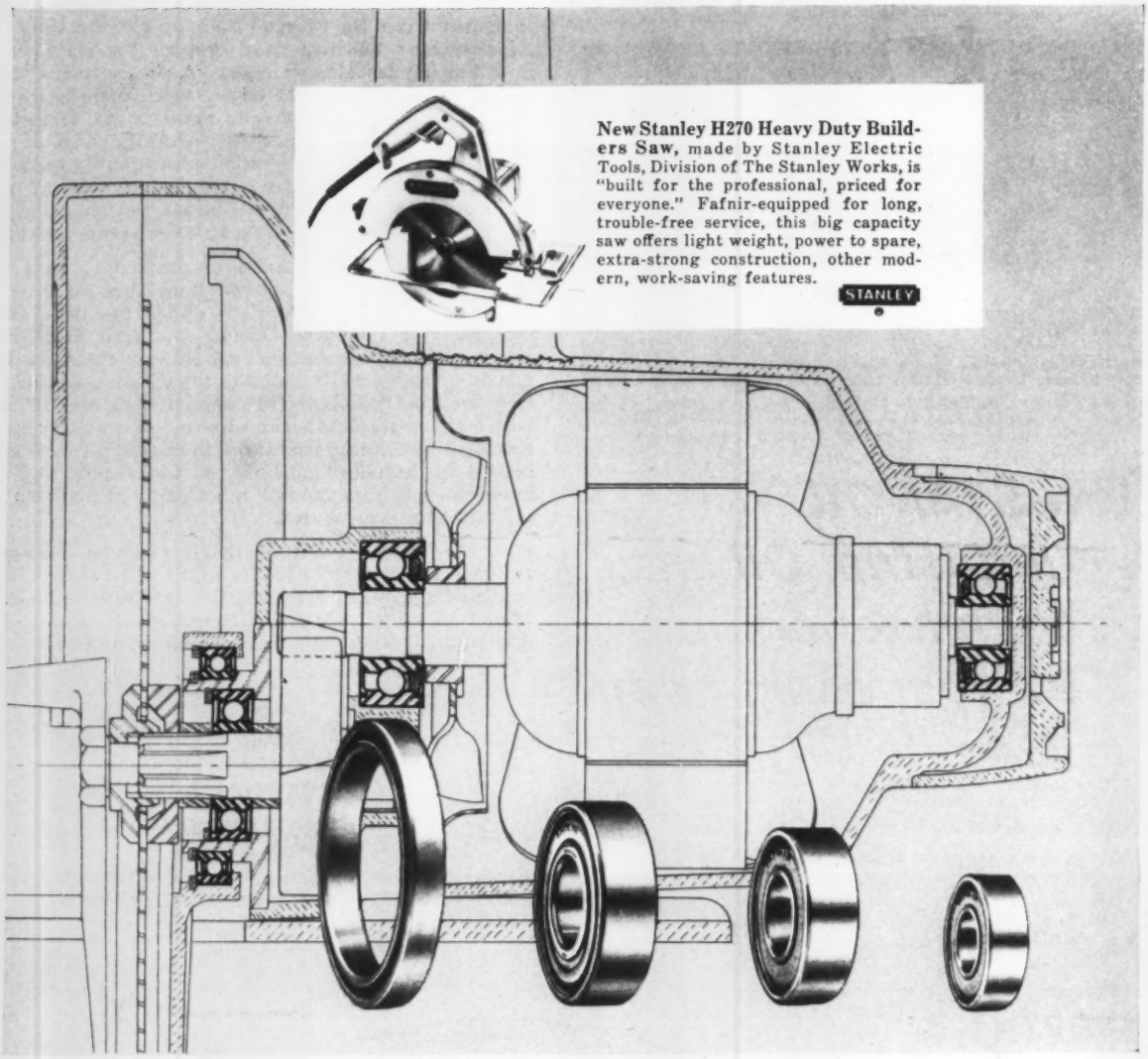
What has happened: Today approximately 1,800 tons rolled is the average shift production. A record of over 2,700 tons rolled has been racked up by one shift in this mill. STANOIL Industrial Oil has continued to deliver top operating performance under these increasingly demanding conditions. Samples of the oil are taken regularly by the Standard Oil lubrication specialist for laboratory analysis to make sure the oil is maintaining specifications. Stocks of STANOIL Industrial Oil are warehoused by Standard at East St. Louis, only twelve miles away, so that the mill has a ready source for the product whenever needed.

What you can do: Get all the facts about STANOIL Industrial Oil from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.**

STANDARD

You expect more from Standard and you get it!

Bearing assembly viewed from inside by J. H. Koester and Sandy Wehking. Sandy Wehking knows industrial lubrication. For 17 years he's been providing lubrication technical service to industrial customers. He studied chemistry at Blackburn College and has completed the Standard Oil Sales Engineering School.



New Stanley H270 Heavy Duty Builders Saw, made by Stanley Electric Tools, Division of The Stanley Works, is "built for the professional, priced for everyone." Fafnir-equipped for long, trouble-free service, this big capacity saw offers light weight, power to spare, extra-strong construction, other modern, work-saving features.

STANLEY

New Stanley power saw, Fafnir ball bearing equipped, designed to deliver nearly 40% more cutting force!

Armature, saw shaft, even the blade guard Fafnir-mounted for free-starting, no-maintenance, heavy-duty performance

Nearly 40% more cutting force at working speeds, with 27% less operator effort! This new Stanley power saw represents a design achievement of the first order. And to insure long, efficient service life, Stanley makes generous use of Fafnir precision ball bearings. Even the blade guard is Fafnir-equipped (with an aircraft type bearing), for responsive action at the slightest pressure. On the armature and saw shaft, Fafnir ball bearings all but eliminate friction and wear. Bearing maintenance is eliminated, too. Various combinations of seals and shields lock out contaminants, lock in factory-packed lubricant. No danger of faulty or neglected lubrication... virtually no chance of bearing failure.

Take advantage of Fafnir's "designer's approach" to bearing problems. You'll find Fafnir's breadth of experience and diversity of line insure precise answers. Write The Fafnir Bearing Company, New Britain, Connecticut.

Sealed and shielded Fafnir ball bearings meet specific service requirements in Stanley saws

Felt seal and shield (Motor Armature)

2 Plya-Seals (Blade Guard)

Plya-Seal and shield (Saw Shaft)

FAFNIR BALL BEARINGS

COMING: A RESEARCH SPEEDUP— "Into the next ten years, we'll telescope material research that would normally require half a century," asserts Dr. Charles N. Kimball, president, Midwest Research Institute. "Space flight is the accelerator, forcing us to . . . develop lighter materials." Wider use of plastics and chemicals, and materials to withstand ultrahigh temperatures, also is speeded, he asserts. By 1970, our research bill may be more than double today's $10 billion.

TURBINE POWERED TRUCK— The first road test of Ford's 704 gas turbine is underway as the Detroit firm continues to hunt means of cutting production costs. Latest maneuver: Investment casting of turbine wheels. Misco Precision Casting Co., Muskegon, Mich., is assisting in the search.

HELPS WELD GALVANIZE— Treat the surface with potassium dichromate and hot water and you'll get better welds, advises Westinghouse Electric Corp., Pittsburgh. In making transformer tanks, the firm shot peens welded areas and spray coats them with zinc. Formula: 32 ounces to a gallon applied at 120 to 140° F for 2 minutes.

AN AID TO METALWORKING—A porous plastic material called Porelon (it holds large quantities of liquids) is said to have several potential applications: Self-lubricating bearings, self-inking markers (a hand stamp carries its own ink), and windshield wipers which cut through dirt and grease.

COMMERCIAL SCANDIUM NEAR—Experimental quantities of the pink metal are being produced by St. Eloi Corp., Cincinnati. Possible use: As a constituent in magnesium or tantalum alloys for low density, high temperature missile parts.

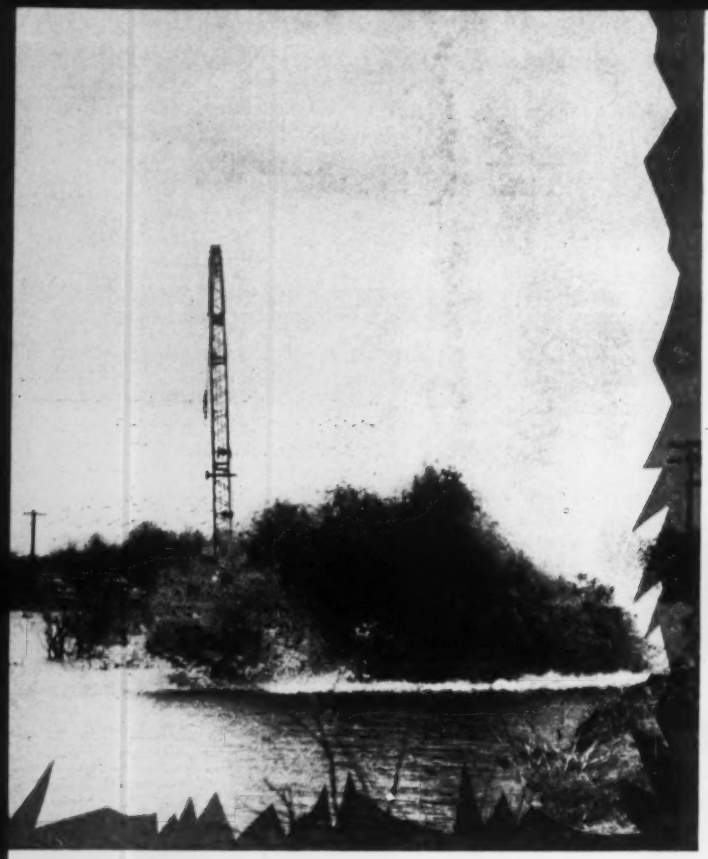
INVISIBLE STAINLESS WELDS—A new method of welding 15-7 stainless produces nearly invisible joints, states Norair Div., Northrop Corp., Hawthorne, Calif. Material adjacent to the weld area in T-sections and butt joints shows no discoloration. Beads are scarcely visible; sheets don't distort; and chemical milling affects neither weld nor adjacent material. Key: Extremely close control. Metal temperature on the puddle is 3000° F. Only 0.030 in. away, it drops to 350° F.

SIZES PARTICLES AUTOMATICALLY— An AEC project is said to hold this promise: You will be able to determine the size and distribution of particles in paints, plastics, ceramics, grinding wheels, muds, and similar combinations, says Evans Research & Development Corp., New York. The technique will rely on soft beta rays originating in selected radioisotopes.

HIGH TEMP BEARING PROGRESS—Gas lubrication permits shaft rotor speeds up to 500,000 rpm at minus 450° F to more than 3000° F, reveals Prof. Dudley D. Fuller, Columbia University. Other advantages of such bearing systems which were described at an international symposium on gas lubricated bearings (Washington): Friction is low; the systems are simple, reliable, quiet, and last a long time.

NEW LIGHT ON DEEP DRAWING—Directionality of crystal structure, often considered detrimental in good drawing sheets, is an important property of drawing quality, R. L. Whiteley, Bethlehem Steel Co., Bethlehem, Pa., reported at the Metal Show. Normal directionality is indicated by a high average strain ratio and accounts for the general superiority of aluminum killed over rimmed steels, he claims.

MAY CUT OUT REACTOR CONTROL RODS— A liquid, fluidized-bed reactor being developed by the Nuclear Div., Martin Co., Baltimore, will rely on the flow of cooling water to regulate spacing between pellets of fuel—a technique which will simplify reactor construction. (Spacing controls the fuel reaction and the heat generated.) Current designs include metal control rods which shield fuel elements to regulate the reaction rate.



Explosion churns water used to transmit shock wave. Crane lowered 14 ft die. Ten lb of explosives were needed to form the 8 ft dished head for a railroad tank car (right)

Du Pont Reports on Explosive Forming

It's convinced the process can do a fine job in one shot runs, part sizing, and hardening. Higher production rates depend on development of a safe explosive that will lead to automated methods

RESEARCH AND PRODUCTION are going hand in hand to bring explosive metalworking into more widespread use, say experts at E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

They point to the increasing number of firms turning out parts: In 1958, STEEL noted just under a score; today, Du Pont says the total has doubled, not counting the people operating on the quiet.

The firm now has enough experience to recommend considering explosive methods for these applications:

- Single shot forming.
- Finish sizing.
- Improved mating of parts.
- Hardening of austenitic steels.

These are the advantages: Explosive shock waves at all stages distribute stresses over the surface being formed; equipment costs are frequently less than those of conventional types; the process, by distributing stresses, obtains full use of material formability.

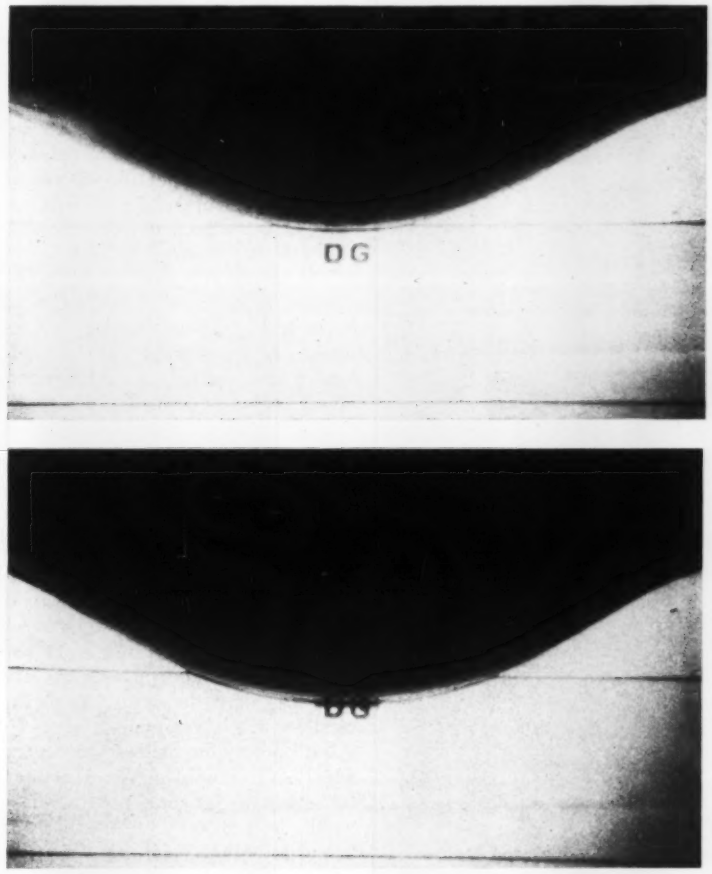
Some limitations: Explosive forming is not yet a mass production operation but is still predominantly experimental. It is limited to rather simple shapes. Contrary to some earlier claims, brittle materials cannot be formed by explosive techniques.

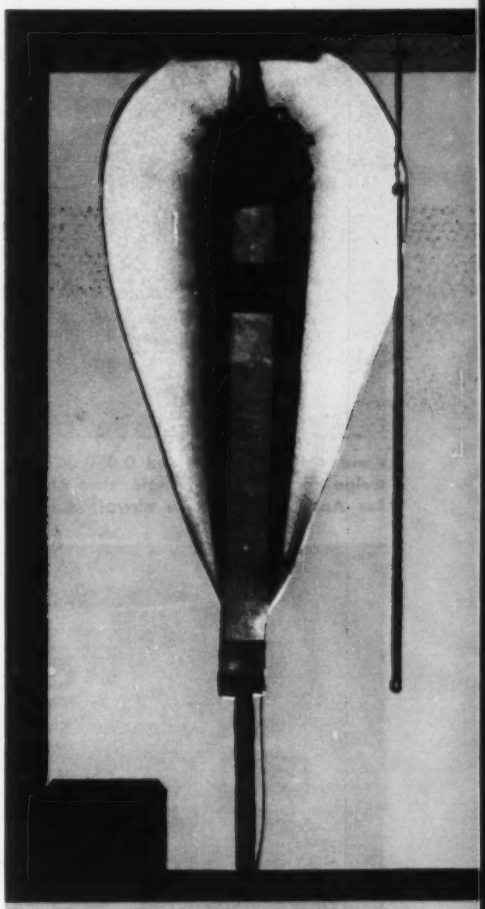
• The Du Pont people have found explosives pretty handy in their investigations for cup or hemisphere forming.

Bulkheads are a good example. The largest so far, a hemisphere 8 ft across and 3/16 in. thick, was

How Du Pont Studies Explosive Forming

These photographs were taken 2.4 millionths of a second apart while a plate was being explosively formed. Speed is so great it deforms wire probe without bending it





Here's a shock wave traveling at nearly a mile a second. Work is done by shock, not by 1 million psi gas bubble (black area) which follows

a tank car end made for Graver Tank & Mfg. Co., East Chicago, Ind., a division of Union Tank Car Co.

The piece had been difficult to form without wrinkling, and tooling for conventional methods could prove to be prohibitively expensive. Forming scaled-down heads only 1 ft in diameter provided enough preliminary information for the full scale shots.

Mild steel was used for a 14 ton female die. A designed, 10 lb charge furnished the power. Air forms a cushion beneath a blank which prevents contact with the die surface, so the female die was evacuated and the assembly lowered into a pond for the forming shot. (A second shot may be needed to smooth out such a large piece.)

The blank was made by welding two pieces. Sound, properly conditioned welds don't interfere with successful forming.

• **While forming heads, Du Pont noticed only a small amount of springback in materials used.**

Aircraft and missile people are interested in great dimensional accuracy in shapes formed from conventional materials and many of the new high temperature, high strength alloys.

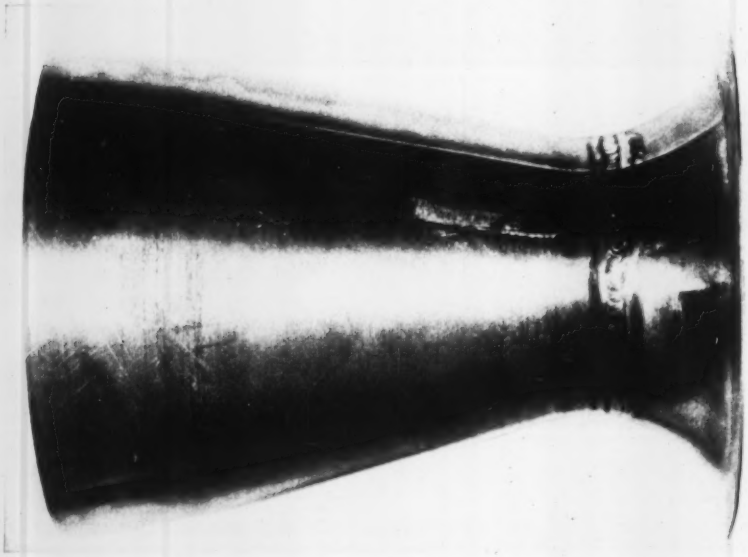
The ability to "size" parts was exploited by Du Pont in a cooperative venture with the Special Products Div., A. O. Smith Corp., Milwaukee. Preformed, AMS 6434, ultrastrength steel domes about 4.5 ft across were sized so that the diameter was accurate to within 0.010 in. and the contour stayed within 0.030 in. of the model.

Other examples: Rocket motor venturis of Type 301 stainless; flanges and joggles in stainless aircraft ductwork; corrugated shapes made from flat blanks for rigidizing of panels; sharp spiral grooves 0.050 in. deep in a 0.005 in. stainless disc.

Parts often can be precision formed by explosive techniques so that they are easy to match with a mating section in later assembly. Example: A corrugated cylinder which had to fit closely enough in-

Band around this welded 0.010 in. stainless cylinder (AM350) has a re-entrant bulge formed by a singie shot of explosive. Marman Div., Aeroquip Corp., Los Angeles, uses it in aircraft ductwork

Plus feature of minimum springback accounts for exceptionally accurate joggle in this missile piece. Previous methods were unsuccessful



Scaled down rocket motor venturi of 0.050 in. stainless was made from two truncated cone shaped pieces. Welds held perfectly

side a tube to permit spotwelding at the corrugations. It was 6 in. in diameter and was produced in a steel die, Du Pont reports.

• Explosives either deflagrate (burn rapidly) or detonate (burn instantaneously). Du Pont prefers working with detonators.

The burning rate of low explosives is comparatively slow (hundreds of feet per second). They require confinement devices (presses and the like) to get the necessary forming pressures of 100,000 to 300,000 psi. Such devices are safe and can be operated indoors.

The reaction speed of high explosives is in terms of millionths of a second. Their energy is released at a constant rate regardless of the method of confinement. Shock fronts generated often reach several million psi and their size and shape can be regulated.

To transmit the shock wave properly, you need a medium of some sort. Air will do, but water is more efficient. The pressure decays through the water medium and pressure at the metal surface is some 50,000 psi. Special cameras which expose a few frames at the rate of a million pictures a second are used to study such explosions and shock waves.

Satisfactory die materials can vary widely. A simple plaster cast may be adequate for one piece, but it would be destroyed in the process. Generally, tool steel dies will do any forming job. What you choose in between is a matter of experiment and experience; each problem must be studied individually.

• Although explosive forming is still in its infancy, it is a practical way to get a job done in a hurry.

The method will form practically any metal which has appreciable ductility, Du Pont has found. As of now, it doesn't look as if it will supplant high speed, repetitive mechanical forming. Reason: Present explosives do not lend themselves to automation. But the experts hope such a system may be developed.

Du Pont experts predict increasing success for metalworking's newest tool, especially in handling short runs and tough materials.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Stock Shapes Trim Product Costs

Paidar president C. Long Dlouhy conferred with Messrs. Palma and Knapp, of Palma & Knapp Associates, on the use of extruded aluminum parts on redesigned chairs

THE COST CRISIS . . . How to Beat It

FABRICATORS are often able to update products and reduce costs at the same time by changing from one material to another.

A switch from custom to standard mill shapes helped keep manufacturing costs in line when Emil J. Paidar Co., Chicago, modernized its line of barber chairs.

• Engineers, designers, and production personnel agreed that a material change would help update the company's chairs and shave production costs.

Irregularly shaped parts made long, tedious hours of hand sanding and polishing necessary. (It took almost 6 hours to sand and polish parts for one chair.) Extensive plating of the parts was required.

When the company decided to modernize its line, material and fabrication costs of all major assemblies were reviewed. Industrial engineers, designers, and production personnel considered new materials and production methods. Prototype chairs were built from designs suggested by Palma & Knapp Associates, industrial designers, Chicago.

Anodized aluminum is used on parts exposed to abrasion. A 7 gage, cold rolled, plated base replaced a heavy enameled piece, reducing the cost of the part 43 per cent.

• Wherever possible, structural parts were made of standard mill shapes.

Stock sheets, bars, and extrusions helped reduce cross sections and unit weight. They made it possible to substitute abrasive belt polishing for hand finishing. Polishing and buffing time dropped from 5.8 hours per chair to 1.6 hours. Plating time was also reduced. Raw material costs were cut as much as 33 per cent.

Forming of steel parts on punch presses eliminates all milling. Less drilling and tapping are required. Weld nuts, screw machine parts, nylon bearings, and projection welded studs eliminate former fastener and linkage problems.

• Some parts are standard for all chairs in the line.

One satin chrome base was specified for all chairs; it replaces two parts in 13 colors. One steel seat plate is used, instead of three. One steel and aluminum gooseneck and platform front assembly replaced five used on the older chairs.

Our Chip Making Inefficiency

Horace Frommelt
Director
Spring Garden Institute
Philadelphia

The cause, says author Frommelt: The desire to keep the cutting tool on the job as long as possible. He spells out the challenge as he sees it and offers a solution

THE production of machining chips in the U. S. accounts for $5 billion in business annually, yet our machining efficiency is not more than 25 per cent. It's a shortcoming that could reduce us to a second or third rate industrial power.

• **Unfortunately, too often industry's sole concern in machining is the cutting edge.**

The goal is to keep it on the job as long as possible! Any improvement in machines, cutting materials, tooling, or accessories are translated into longer tool life. We think, eat, sleep, and dream about cutting edges that will remain on the job—not for hours but for days.

What does it mean? We baby a $50,000 machine tool to preserve a 20-cent cutting edge. We concentrate on tool costs, forgetting the all-important cost per piece. While the cutting edge is lazing along, the production of pieces slows to a near walk.

Labor costs are constantly increasing, as they probably should. But we do nothing in our machining area to keep the cost per piece down, even though we are favored with more efficient machine tools, better (indeed miracle) cutting elements, and brilliantly designed, ingenious tooling. Our national concern is to keep the cutting edge on the job as long as possible!

• **We should be concerned about keeping the tool on the job as short a time as possible.**

That's the way we can squeeze the most out of high cost capital equipment, high labor charges, and mountainous overhead.

Today, jobs are running at speeds that call for a tool change not more

Is a National Disgrace

This table shows that if you settle for shorter tool life, you can boost machining rates substantially. All data were taken from closely controlled tests on "T-1" steel. Carbide tools were used with coolant.

Cut Depth (Inches)	Feed (In. per Revolution)	Surface Speed (Feet per Minute) 30 Minute Life	10 Minute Life
1/32	0.010	600	900
	0.020	400	550
	0.040	250	375
1/16	0.010	500	750
	0.020	350	490
	0.040	225	325
⅛	0.010	450	650
	0.020	290	425
	0.040	190	280
3/16	0.010	410	600
	0.020	260	400
	0.040	180	250
¼	0.010	390	550
	0.020	250	375
	0.040	160	240
⅜	0.010	350	500
	0.020	225	340
	0.040	150	220

than every 8 hours. The tools probably should be run not longer than 30 minutes. In most cases, 10 minutes would be optimum, and 5 minutes can be right for some jobs. The relationship between the speed of the workpiece over the cutting edge and the time the edge stays on the job is simple: The faster the operation, the shorter the tool life. The longer the tool stays on the job, the slower the chips come off.

There isn't anything devious or intricate about translating the concept into dollars and cents. The cutting tool industry has done a miraculous job in providing wonder materials that can be almost instantaneously indexed to a new cutting edge and brought back to original dimensional setting. The cost of the average carbide cutting edge on an indexable tool is something like 25 cents. The time for indexing is a matter of a minute or two. Machine downtime is reduced to a minimum.

Cutting tool first costs, as well as reconditioning expense and machine tool downtime, are insignificant when compared with the machine tool on which the operation is being done. Then consider high manhour charges that nationally average 12.5 cents per minute (labor and overhead charge), and we have figures that can be readily grasped.

• The only direction our thinking can go is: Speed up the equipment; keep the cutting edge working at the highest possible metal removal rate.

Recently, a shaft turning operation was stepped up from 21 pieces a day to 81, with a price drop of $3.05 to 87 cents each. The secret: Increasing speeds from 226 rpm to 700 and reducing edge life from 120 minutes to 19 minutes. True, tool costs jumped from $1.18 to $7.45 a day, but they were insignificant because greater speeds boosted chip production fourfold. At any rate, machining costs dropped some 70 per cent.

• This national disgrace represents American industry's big blind spot.

It is evidenced in numerous ways. First, there is the universal tradition and a matter of tragic pride "to keep a tool on the job as long as possible." Then there's the talk and publicity to salute the hero who can boast: "This tool stayed on the job 8 hours."

More than 50 years ago, Frederick Winslow Taylor, a pioneer in machining efficiency, complained: "For many years it has been usual for salesmen of tool steels to give detailed accounts of the number of hours tools made from their steels would cut metals without regrinding . . . For 99 per cent of the work of the average shop, the criterion is of no value. The man who boasts of having run a tool without regrinding, say for a longer period than 1½ hours on ordinary shopwork, is merely boasting of how little he knows about the art of cutting metals cheaply."

Mr. Taylor's observation was made in 1906. It was based upon 26 years of intensive investigation. Significantly, he conducted all his work on the basis of a 20 minute tool life—and, don't forget, that was in the days when steel shanks were forged, ground, and reset on the job.

• A quick glance at speed-feed tabulations shows how we should be conducting our chipmaking opera-

tions at this time.

In the table on Page 79, we could machine a 1/8 in. depth of cut with a 0.010 in. feed at 450 sfpm and expect a 30 minute tool life. If we become less captivated with the preservation of a 25 cent cutting edge, we can boost the speed to 650 sfpm, and our production will jump by nearly 50 per cent.

Working the other way, by worrying about the cost of the cutting edge, we would crop our production rate by 30 per cent. If we strive for tool life of 2 hours, we will penalize ourselves to the tune of about half of the production we can get with a 10 minute life.

• When we settle for a realistic tool life, the result can be an astonishing reduction of machining costs, even though the tool material costs are multiplied two or three times.

On a turret lathe job, where the surface speed was upped from 250 to 650 sfpm, the tool edge life dropped from 4 hours to 25 minutes, but production went up from 51 to 224 shafts a day. Tool costs, to be sure, rose from 33 cents to $3.14 a day—but the piece price was cut from 94 to 23 cents.

Management admitted that a further decrease in edge life on the lathe tools would bring further benefits. The time to halt: When increasing tool costs and increasing machine downtime costs for tool change outweigh the gain in production or the savings in part cost.

Another example: A milling cutter, used on a malleable workpiece, now has an edge life of 30 minutes vs. 4 hours before. Tool costs rose from $56 to $60.92 a day, but total part costs dropped 56 per cent, and production increased from 112 to 277 parts a day.

A growing list of such machining success stories proves that our 50 year old tradition, "keep the tool on the job," ought to be retired. In its place, we should be asking: "How much faster can I operate these wonder materials, the recently developed carbides and ceramics?"

Then we stand a chance of remaining a first-rate nation in the productivity standings.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

The 3 in. strip (Bear No. 112) pulls off easily, leaves no residue

Tape Resists Boiling Tar; Keeps Pipe Ends Clean

Pipe manufacturer uses it in the fabrication of leakproof joints. Adhesion and stability are said to be good up to 450° F. Only one thickness (overlapped) is used

HEAT resistant paper tape can keep pipe ends clean even when they are immersed in boiling tar, says Valley Mfg. Co., Valley, Nebr.

The steel pipe is dipped into 450° F tar to guard against corrosive agents in soil.

Ends must be clean so they can be joined with other units to form leakproof seals.

• **Tested First**—In a test conducted with Behr-Manning Co. (Troy, N. Y.), a 3 in. strip of No. 112 Bear masking tape was applied. The pipe was immersed in a vat of hot tar for 10 minutes, lifted out, then cooled for 10 minutes.

The tape peeled off easily, leaving a smooth surface with no residue. One thickness of overlapped tape was used.

Behr - Manning, the supplier, points out that the pressure sensitive adhesive has a rubber base. In addition to its resistance to high temperatures, it has good stability and adhesion.

When the job calls for "gearhead motor"

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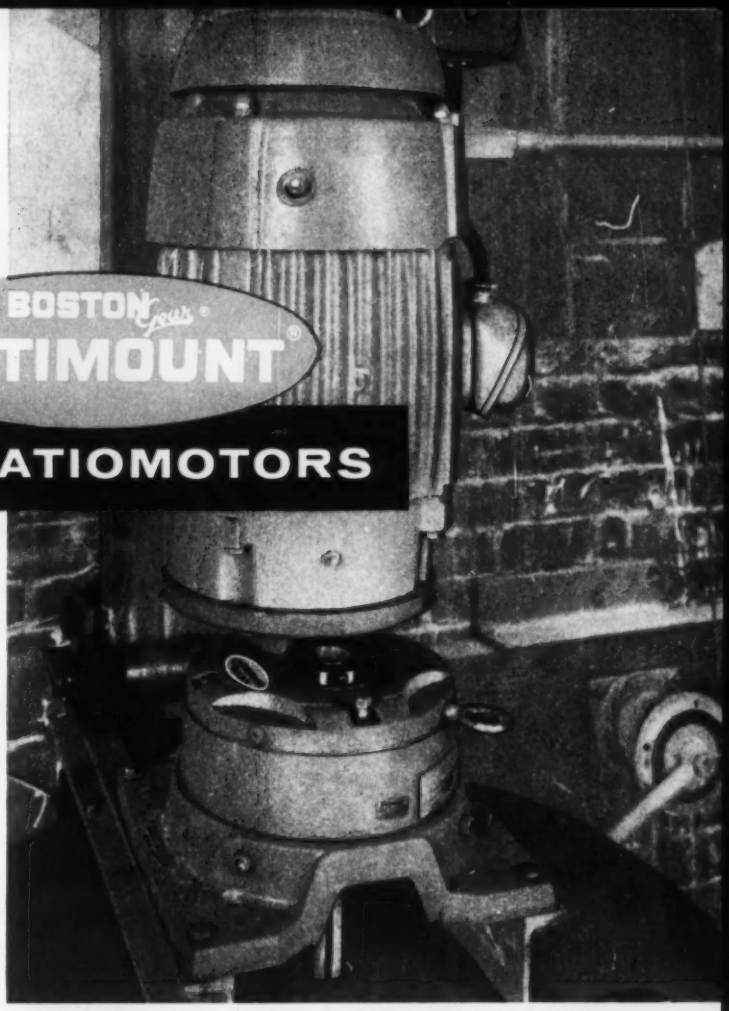

VERTICAL BASE MOUNTED OPTIMOUNT RATIOMOTOR drives agitator blade shaft on pigment mixers in coated textiles plant. Manufacturer says: "OPTIMOUNT adaptability permitted simplified, efficient design for our specific needs . . . at a much lower cost for the complete installation."

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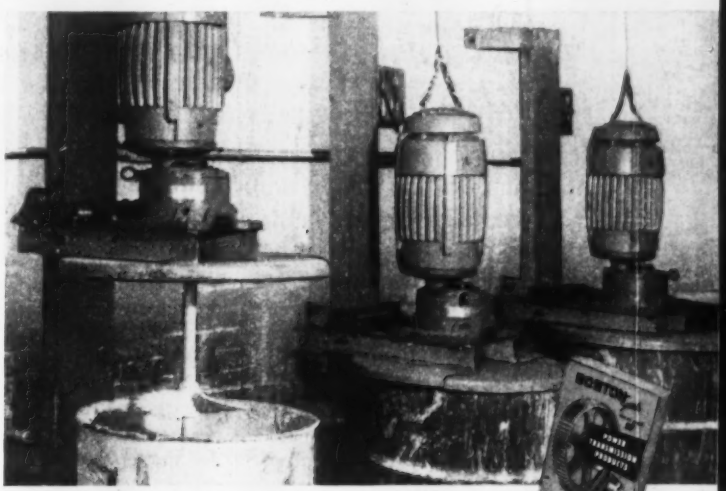

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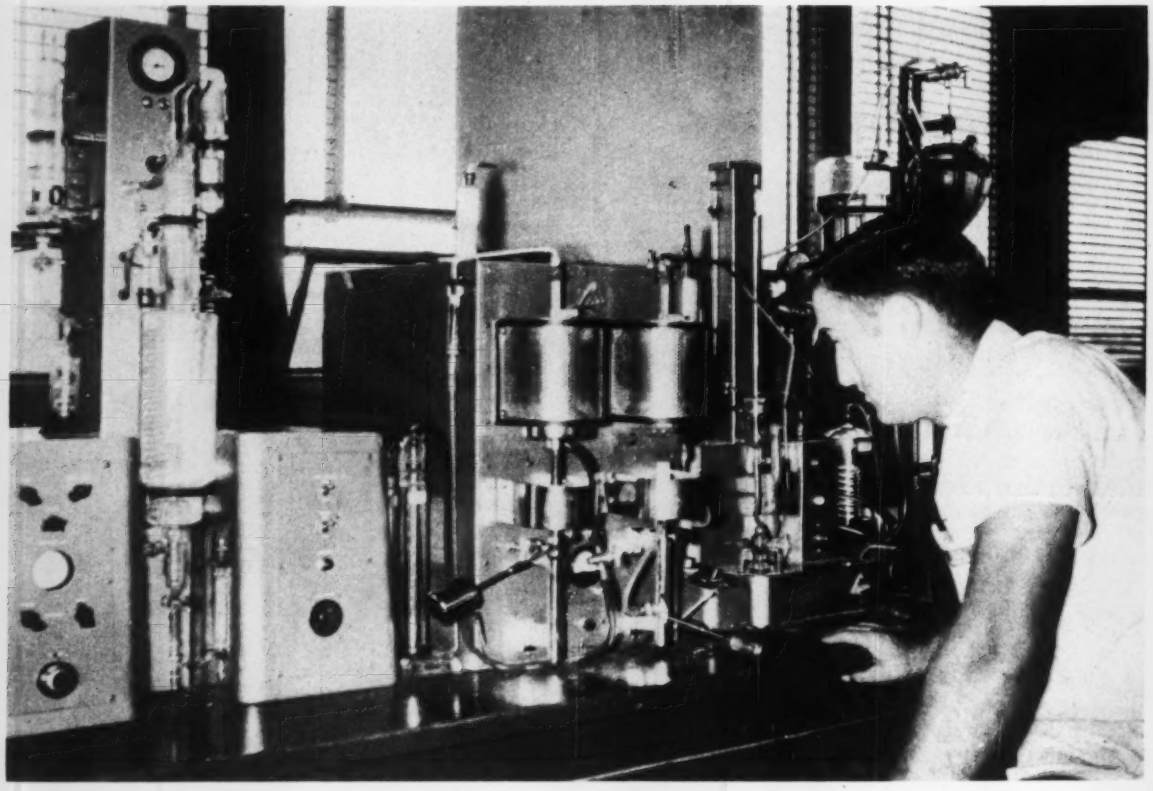


Research equipment is used to analyze production samples from ferroalloy plants

Purity of Alloys Checked By Vacuum Fusion Analysis

Tests of production samples reveal hydrogen and oxygen content in addition alloys; information helps steelmakers predict percentage of gas in steel before it's made

CLOSER CONTROL of hydrogen and oxygen in alloy additions is helping steelmakers hold down gas content in the metal they produce. In some cases, laboratory methods and equipment are being used for production testing.

One alloy producer, Vanadium Corp. of America, is using the vacuum fusion method at its research center in Cambridge, Ohio, to determine gases in production samples sent from its plants.

• Samples are vacuum melted in a carbon crucible. Released gases are measured accurately.

Hydrogen and oxygen values can be determined accurately, says V. S. McMullen, metallurgist. But determination of nitrogen isn't reliable. Reason: As gaseous nitrogen leaves the molten metal, it combines with cooler metal on the sides of the crucible.

As the sample melts, gases are released; hydrides, nitrides, and oxides are decomposed. Oxygen reacts with the carbon crucible, forming carbon monoxide.

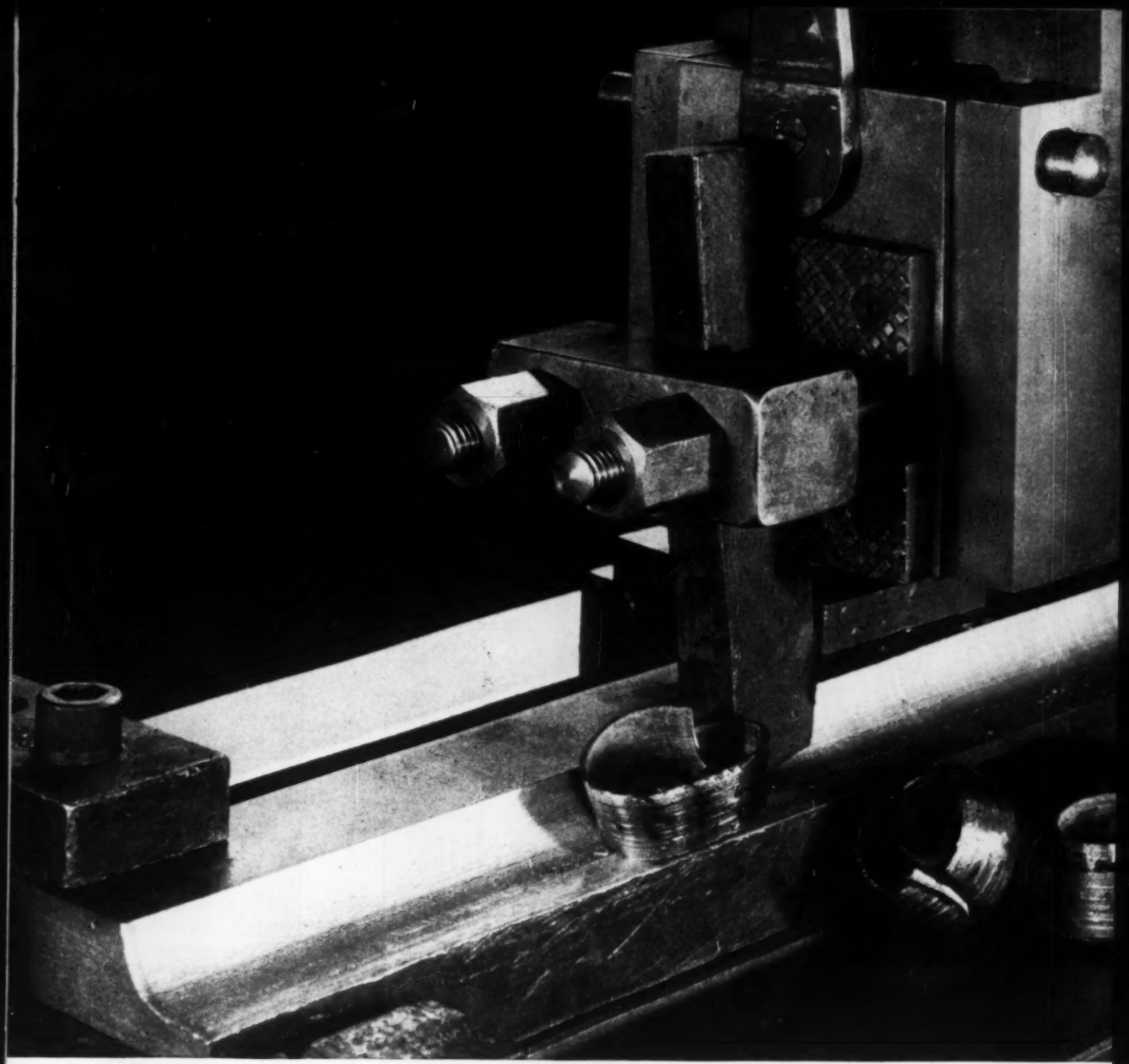
A heated palladium tube, which passes hydrogen but retains other gases, separates hydrogen from nitrogen and carbon monoxide. The pressure and volume of isolated hydrogen are measured, and the weight is calculated.

The pressure-volume ratio of nitrogen and carbon monoxide is measured; carbon monoxide is transformed into carbon dioxide and absorbed from the gas stream. The system is sensitive enough to measure a minimum gas content of 0.0002 per cent.

• Results are typical of an entire lot only if representative samples are taken.

Five or six samples are taken from different locations in a batch of solid or crushed metal, or one sample is taken from the batch while it's in the molten state.

If a molten sample is taken, it is cooled immediately and kept several degrees below the freezing point of water to prevent loss of hydrogen by diffusion.



Machining gib for heavy duty lathe from cold rolled steel. Depth of cut: ¾"; feed: .060"

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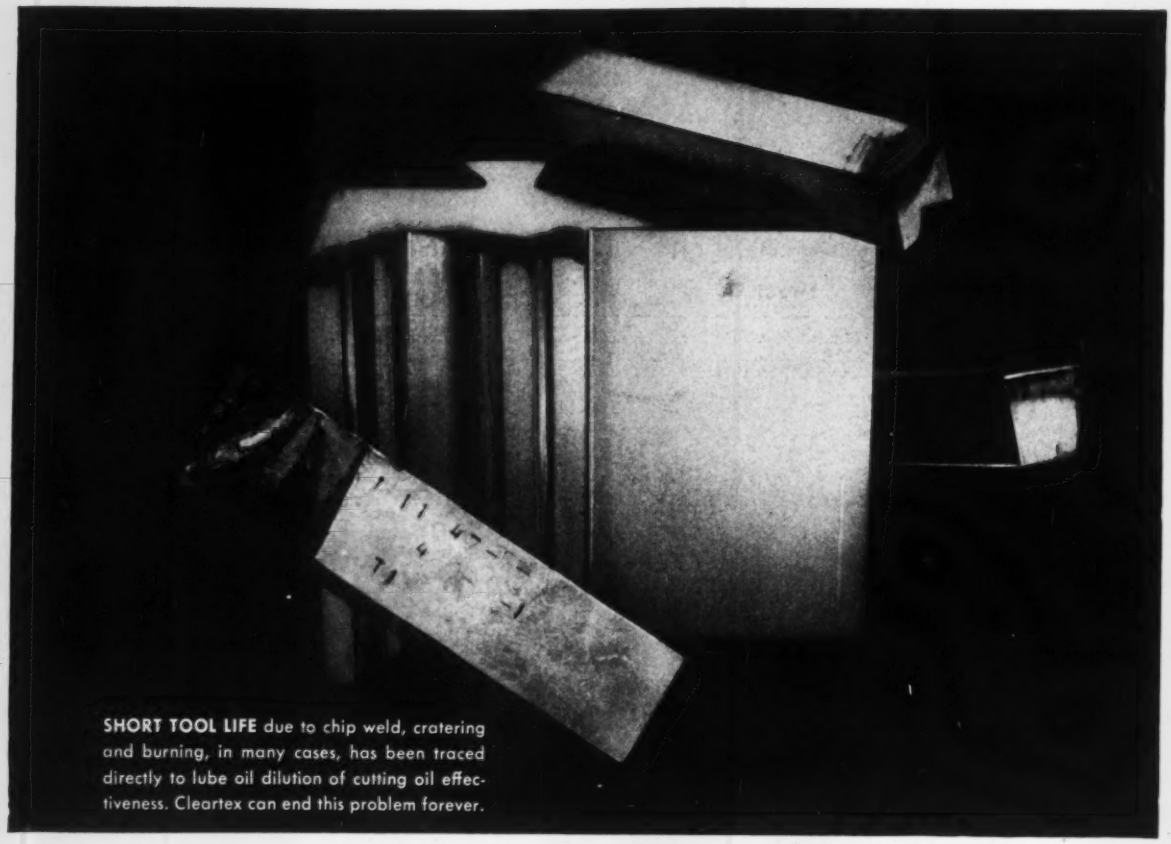

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Lubricating oil is probably leaking into the cutting oil sumps of your automatic screw machines as you read this. Current research proves that this is happening in 70% of all the automatics in use today! And where it happens, it shortens tool life by as much as 50%—even 70%. On top of this, the cost of extra regrinds, lost production during tool changes, and excessive scrap production is putting a premium on screw machine operation in too many shops.

Look for these symptoms. One sure sign of dilution is the need for frequent refilling of the lube oil sump. If you are using an ordinary lube oil, this dilution will create two additional—and more costly—symptoms: excessive scrap production and frequent regrinds. Now you can eliminate these forever with the

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LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Continuous Flow Systems Lubricate European Mills

Continuous flow oil circulating systems will lubricate mills being made for two large European steel companies. The systems will be supplied by Dravo Corp., Pittsburgh.

The company will deliver Dravo-DeLaval mill lubrication systems, in two sizes, to Blaw-Knox Co., Pittsburgh, for installation on mills being built for August Thyssen-Huette AG, Germany. Duplicate systems will be used on mills being made by Blaw-Knox for ILVA, an Italian firm.

The larger systems will serve pinion stands of universal roughers and edgers, on 50 in. flange beam mills. Positive displacement, rotary, circulating pumps will deliver 35 gpm of 2200 to 2600 SSU oil at 100° F, from a 1000 gallon reservoir.

Smaller systems will lubricate pinion stands on universal finishing mills. Similar to the larger units, they will pump 12 gpm of 2200 to 2600 SSU oil, at 100° F. Reservoir capacity: 500 gallons.

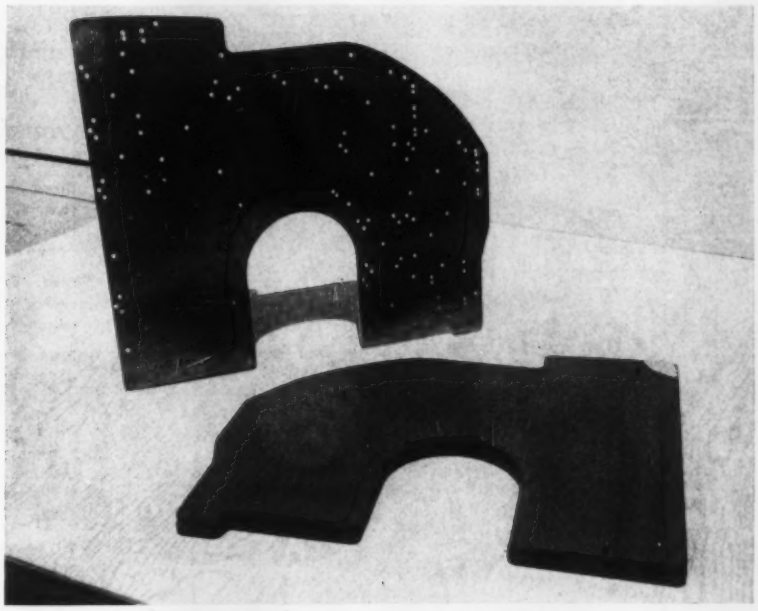
Each system will have automatic filters, alarms, and supervisory equipment. Pushbutton control panels, selector switches, and relays are included in the complete engineering package furnished by Dravo. The company will also handle piping details, equipment arrangement in the oil cellars, and preparation of electrical diagrams.

Liquid Wax Coating Dries Hard, Checks Rust

In-storage corrosion protection and clean handling are said to be the advantages of a liquid wax dip for automobile exhaust and tail pipes, says Arvin Industries Inc., Columbus, Ind. The coated parts can be handled without soiling the hands.

The process starts with cleaning in a vapor solvent degreasing tank. Trichloroethylene is used to preserve the sheen and appearance of the new metal. After dipping in the liquid wax solution, the parts are dried.

Each processing unit can handle up to 44,000 pipes per day. Tests show that the parts have good corrosion resistance.



Plastic doubled material costs, cut manhours from 11.1 to 1.5 for part (bottom)

Plastic Laminate Tooling Saves $150,000 Annually

PIN ROUTER BOARDS made of phenolic laminated plastic are expected to save $150,000 annually at Grumman Aircraft Engineering Corp., Bethpage, N. Y.

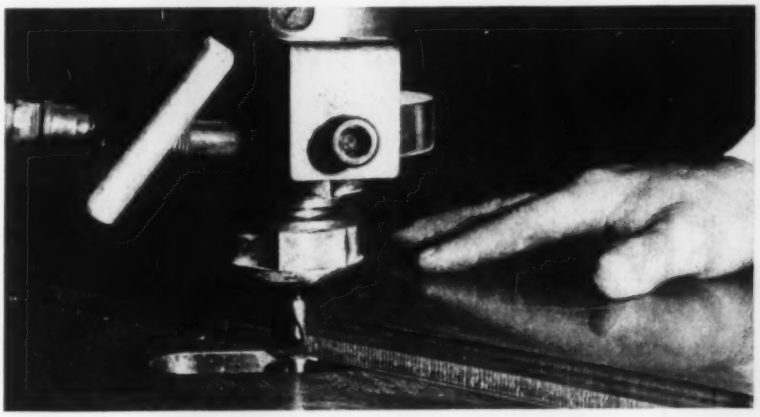
Material cost is twice as high as that of the former material, but fabrication is ten times faster.

With the new material, fabricating time is 1.5 hours per board. Using the original combination of materials, each router board required 11.1 hours. Labor savings per board are estimated to be $40 to $50.

• **Additional Savings** — Cutter life has been extended from four or five boards to 36. The cutting tool is sharpened after every 12 boards.

The plastic is a standard grade made by Formica Corp., Cincinati, a subsidiary of American Cyanamid Co.

Cutting tools now machine 36 plastic parts vs. four with previous material



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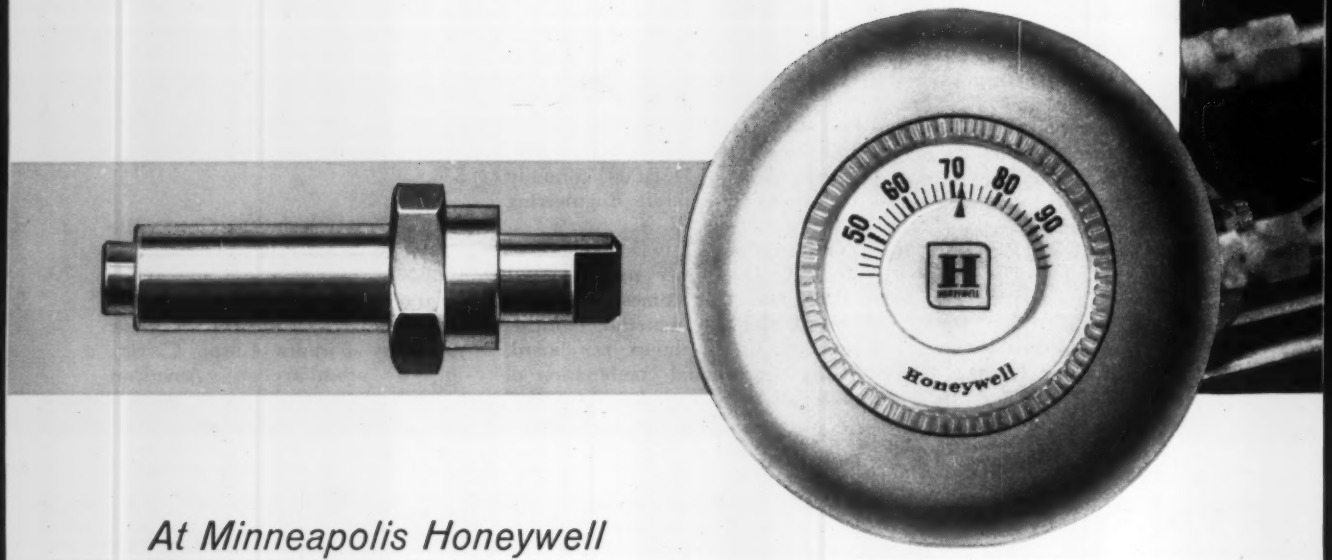

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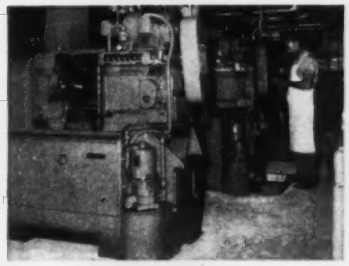
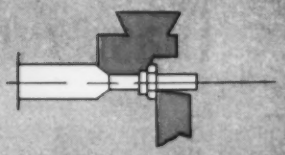
. . . Saves 200% in Machine Hours

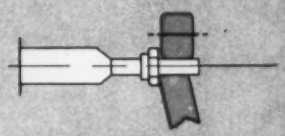


Battery of 7/16" RA-6 Spindle Acme-Gridley Bar Machines

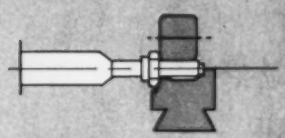
7 Operations in 2.75 Seconds



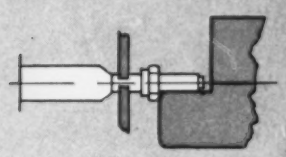
6. Form Rear—Rough Turn—Front Dia.



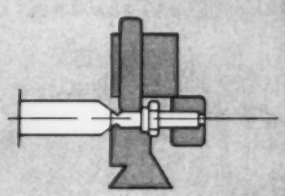
1. Finish Turn Front Dia.



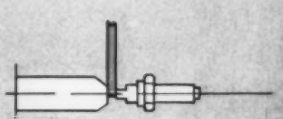
2. Form Small Dia. and Face End—Support



3. Stop Spindle—Cross Mill Flats—Support



4. Start Spindle—Shave Rear Dia.



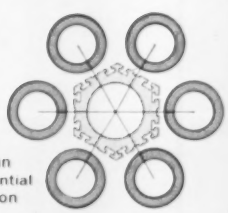
5. Cut off

Close up of tooling zone showing 3rd, 4th and 5th position operations

. . . *in addition* the reject rate is reduced 200% and operator hours slashed 300% in the production of a precision center post component for residential thermostats. What's more, with one machine, one set of tools, and one operator doing all machining in the primary setup, quality control is greatly simplified, and valuable floor space saved. Still further savings result from greatly reduced machine maintenance.

Such drastic savings are possible for Minneapolis Honeywell because of inherent Acme-Gridley features such as independently operated tool slides, the extreme accuracy and flexibility of direct camming, and wide open tooling zones. Rugged and versatile 7/16" Acme-Gridleys fit right in with Honeywell's program of "Total Machine Utilization"; will pay off for years to come by economically accommodating the materials and setups Honeywell requires in the production of small, high quality parts for their precision instruments.

Get the complete story on how Acme-Gridley Automatics provide industry's most modern approach to cost reduction. Call, write or wire.



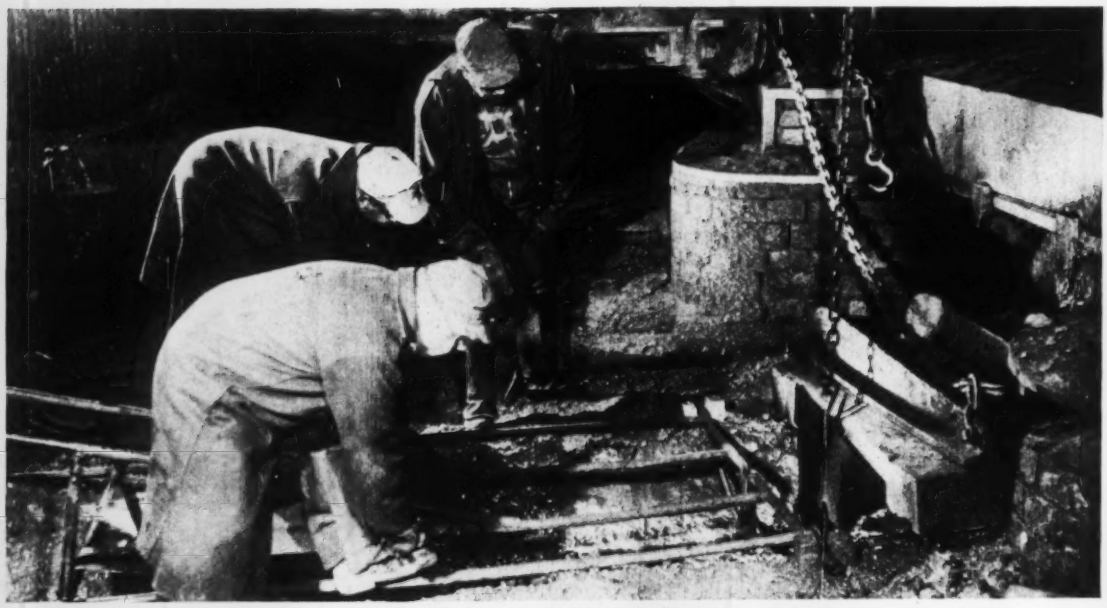
Pioneer in Circumferential Automation

National Acme

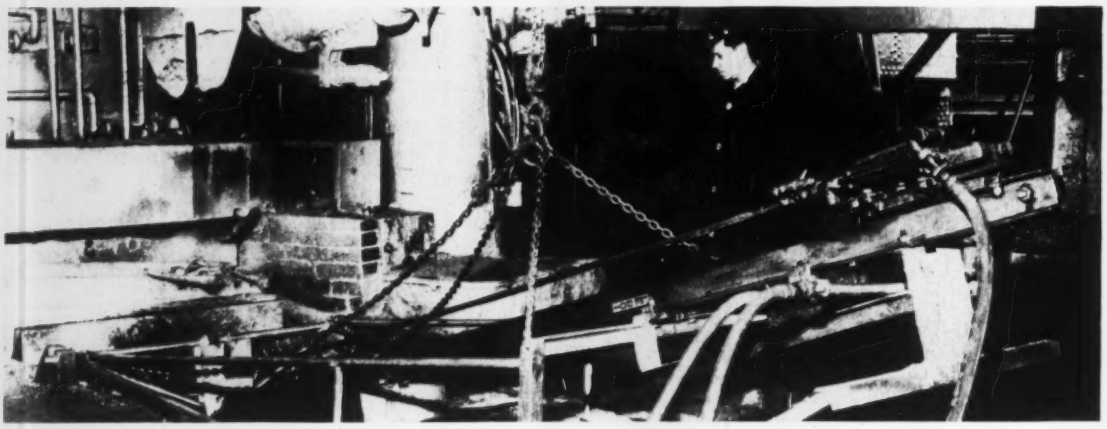
The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N. J.; Chicago 6, Ill.; Detroit 27, Mich.

Blast Furnace Tapped with Coal Drill



HAND DRILLING put tappers close to hot metal



AIR HAMMER makes job shorter and safer

POWER tools, borrowed from the jobs they're designed for, can often be parlayed with new techniques.

Example: Blast furnace workers at the Pueblo (Colo.) plant of Colorado Fuel & Iron Corp. borrowed an idea from the coal industry to make the tapping crew's job a safer one.

• A coal mining drill rig was modified and used to make tapholes.

Manual drilling of the clay plug that seals the furnace is eliminated. Drilling with the converted coal rig, workers stand well out of the way of sparks and beads of hot metal flying from the taphole when the drill breaks through the hearth and into the molten iron.

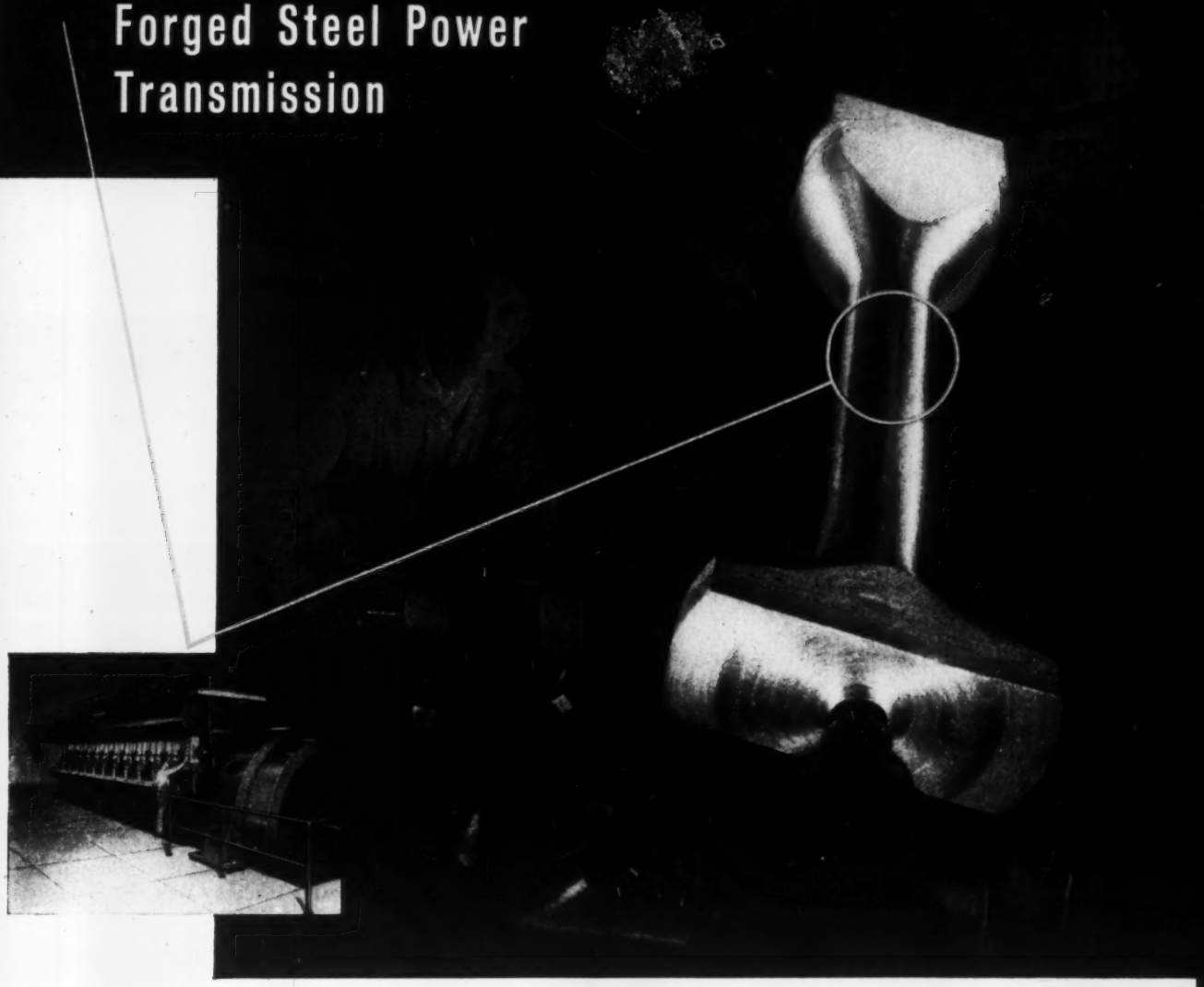
After the taphole is drilled, the rig is taken away by an overhead crane and stored on the side of the bustle pipe.

• The miner's air hammer was put in a frame tailored to tapholemaking.

Business end of the rig is a jackhammer that rides on a 12 ft chain drive feedshell, powered by an air motor.

A rack designed by the company's blast furnace personnel guides the drill as the air motor and chain drive system moves the jackhammer into the taphole.

1500 lbs. of Forged Steel Power Transmission

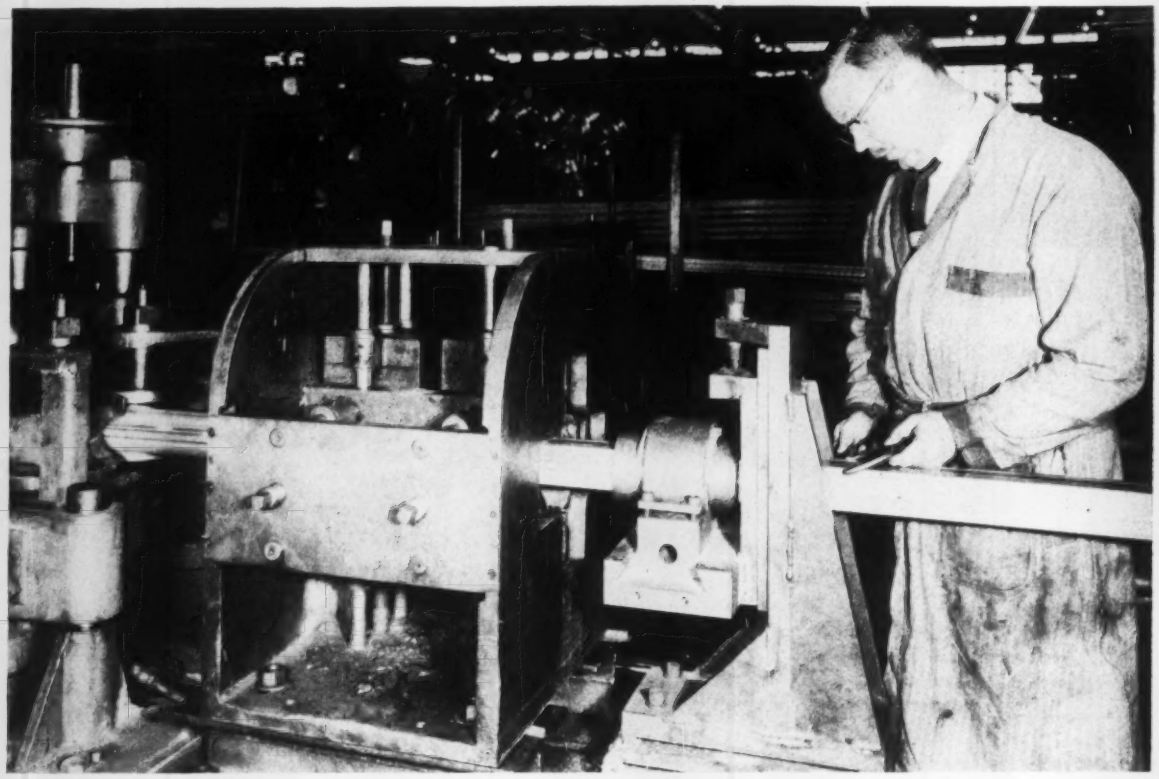


This 1500 lb. forged steel diesel engine connecting rod is taking a "dressing down". At working weight (1400 lbs.) it will transmit horse power in a municipal power plant. Another photographic example of the diverse sizes and weights of component parts going through our forge shops daily. You are assured of the same engineering and metallurgical quality control, the same careful craftsmanship which characterize steel forgings weighing 80 tons and more, when you place with us the responsibility for making any size forged steel component part.

Regardless of the size or weight of steel forgings or castings you require, it will pay you to consult with us.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA



Round tube is drawn square, checked for size . . .

Welded Tubing Measures Up For Atomic Reactor Use

Square stainless steel material was used to make cooling jackets for fuel core subassemblies. Conventional forming and straightening techniques were employed

NEW manufacturing methods aren't always needed for special jobs.

Example: Standard Tube Co., Detroit, found it could make square stainless steel tubing suitable for atomic reactor components through the careful choice of conventional techniques. The tubing was developed for fuel core subassemblies in a reactor at the Enrico Fermi atomic powerplant near Monroe, Mich.

• **Designers asked for the material to make heat transfer jackets for fuel cores.**

Each core subassembly contains 144 fuel pins, 32 in. long and 0.158 in. in diameter. Type 347 stainless was chosen for the core covers by engineers at Atomic Power Development Associates Inc., Detroit. Reason: It could handle liquid sodium at 900° F, 100 psi, used to cool the fuel pins.

Engineers knew they'd need close tolerance tubing for the jackets to insure full control of reactor operation. They decided that square tubes, of the type required, could be held to specified dimensions if they were made by welding.

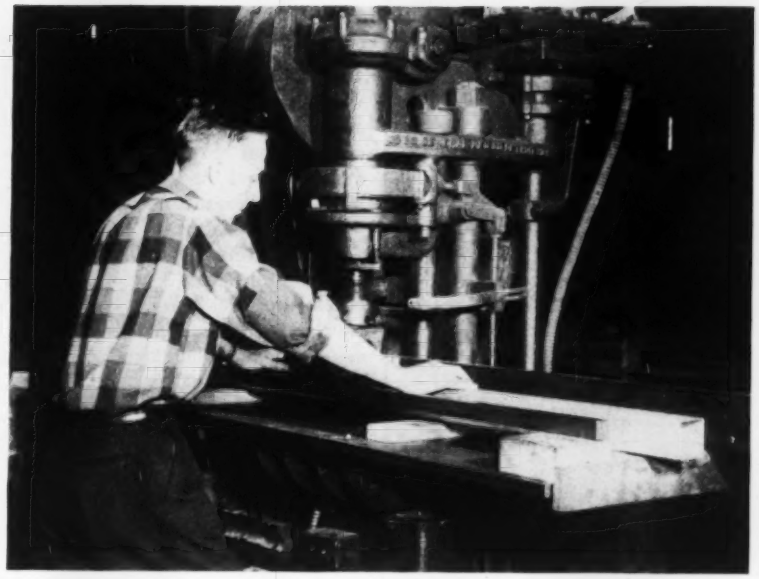
• **Development of the tubing required close co-operation between the designer and the supplier.**

Engineers at Standard Tube and Atomic Power Development Associates did extensive development work, including redesign of drawbench dies. They made many experimental runs of tubing, modifying the product and improving straightening techniques until they were able to make suitable reactor tubing.

The tubing, made from strips, is first round formed and welded. Then it is rough shaped by turk's-head rolls.

Rough shape dimensions are held to specified values to insure proper bench drawing, which produces the final square tube. Finally, the tubing is straightened on an arbor press.

• **All dimension and straightness**



. . . Later, an arbor press straightens it

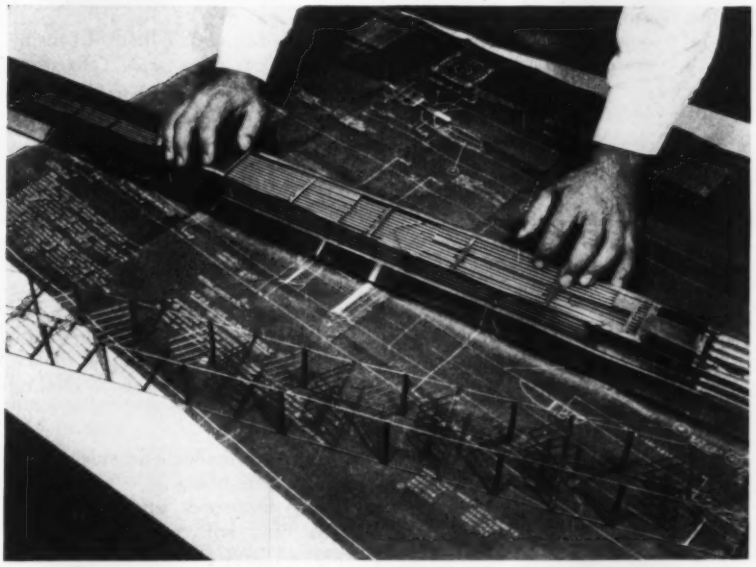
tolerances were tightened to upgrade the tubing.

The material has a wall thickness of 0.093 in. It's 2.646 in. square, with a tolerance of ±0.0035 in. The inside diameter must be within 0.0025 in. of specification. Straightness is also vital; only 0.020 in. of runout is permissible per 6 ft length.

APDA designers specified that tubes should pass through a theoretically perfect tube 74 in. long, with an inside diameter of 2.683 in.

Industry standards for stainless steel tubing aren't so severe. A tolerance of 0.010 in. is allowed on outside diameter, and gage can vary up to 10 per cent. Tubes are straight enough if variation isn't more than 0.150 in. per 6 ft length.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Square jacket holds 144 fuel elements

Metal Blood Container Shows Market Potential

Metal containers for prolonged storage of whole blood are being tested by medical researchers, reports Linde Co., a division of Union Carbide Corp., Tonawanda, N. Y.

To the basic metal producer and the fabricator, this can be a market worth exploring.

The potential for metal containers is promising. Medical people predict a minimum of 5 million transfusions per year. Requirements for government stockpiling (for disasters) may run into tens of millions of transfusion units.

The success of the program, which is said to be imminent, will trigger the need for supporting equipment. Large refrigerated storagerooms will call for automated handling equipment.

Specifications for the containers are rigid because the metal must be immersed in liquid nitrogen (its temperature is below −300° F) then subjected to thawing within a matter of seconds. To avoid damage to the red corpuscles, the maximum time for passing through the critical zone (0 to −50° F) is 10 seconds.

Clement W. Cowley, head of Linde's Bio-Engineering Section, lists a few of the requirements the metal must meet: Adequate ductility at low temperatures; good heat transfer characteristics; good joining and welding properties; good appearance; ease of coating for color coding.

Linde tried a variety of metals and shapes. Aluminum and magnesium closely approach the ideal. Greater use is being made of aluminum because of its price and the availability of sizes and thicknesses. Titanium meets the qualifications, but it is too expensive.

Line Sorts, Stacks Sheets

A high speed, automatic line for sorting and stacking sheets is announced by Schloemann AG, Dusseldorf, Germany.

Strip is cut into sheets, which are transferred by conveyor to a sorting belt. Faulty sheets are thrown off at two sorting stations; acceptable material continues to the end of the belt.

NEW FROM KIDDE!

2½-gallon pressurized water

2½-gallon anti-freeze (loaded stream)

The easiest-to-operate portable fire extinguishers on the market today!

Here, for the first time, is a practical, sensible design for pressurized water and loaded stream extinguishers. No inverting, no bumping, no valves to turn, no pins to pull (safety lock automatically releases when nozzle removed).

These two new stainless steel Kidde portables feature simple, one-two operation—just aim at fire and push the button. Notice the way the hose is stored, safely out of the way. Notice the wide-open handle—to insure fast action even in gloved hands. Notice the dust-and-waterproof pressure gauges—which show at a glance whether the units are fully charged. All of the features—plus the slim design and light weight of these Kidde portables—make them the easiest-to-store, easiest-to-carry, easiest-to-operate portables on the market today.

Approved by Underwriters' Laboratories. Available in pressurized water for fires in ordinary combustibles, or anti-freeze loaded stream for fires in ordinary combustibles and flammable liquids. For more information, write to Kidde today.

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Hose Bends Easily

TWO MATERIALS, Teflon and stainless, work together in a new industrial hose that will bend over a radius about three times its inside diameter and operate at −65 to 400° F. Current pressure limits (400 psi) are expected to double in the near future.

Maximum size (2 in.) is double that of previous hoses, says Titeflex Inc., Springfield, Mass., which developed a manufacturing technique that means you'll soon be able to buy them in 4 in. and 6 in. sizes.

• A weaving, twisting technique is responsible for the properties of the new hose.

Titeflex engineers designed the tool which eliminates the extruded

This 2 in. pressure hose is reinforced with stainless braiding, can be bent in a 6 in. radius

type of inner core. Instead, unsintered Teflon tape and Teflon-impregnated glass fiber tape are wrapped and fed into a die which spirals them into a laminate.

That type of plastic is generally accepted for the inner cores of hoses which have to be tough, light, and corrosion resistant. Stainless steel wire braiding controls elongation, contraction, and cubical expansion under pressure. Balancing the forces in a pressurized hose eliminates motion when pressures change, a feature which minimizes wire chafing and wear.

• Aircraft, missiles, and steel plants require such hoses.

Such industries employ various hoses that will withstand up to 4000 psi. Teflon types are often installed.

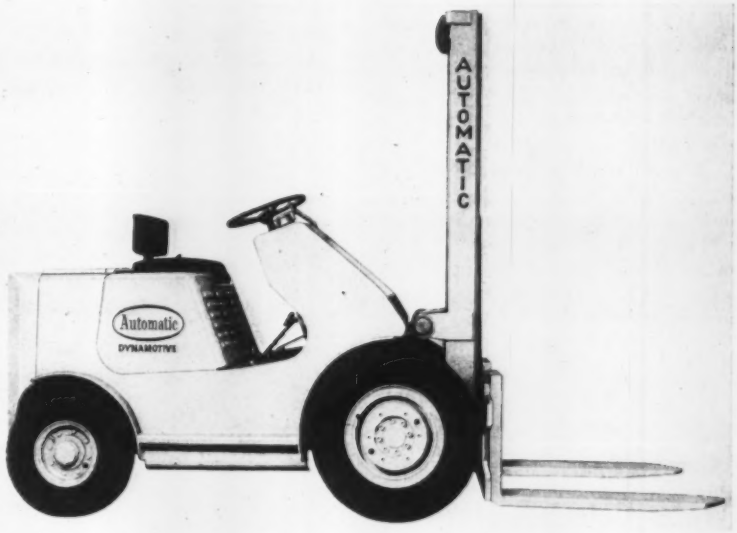
Electric Lift Truck Has Engine-Generator Power

A GAS ENGINE and generator powers the direct current, series wound, electric drive motor on the Dynamotive fork truck. The vehicle has fast acceleration and a travel speed up to 9 mph.

The controlled inching characteristic of the Dynamotive drive improves operator performance and safety, and lowers maintenance, says the maker. The operator has 360 degree visibility, seat accessibility from either side of the truck, plus power steering as standard equipment.

Capacity (at 24 in. load center) is 4000 lb for Model GLFP-40 and 6000 lb for Model GLFP-60. Wheelbase is 60 in. in either model.

For further information, *write* Automatic Transportation Co., 149 W. 87th St., Chicago, Ill.

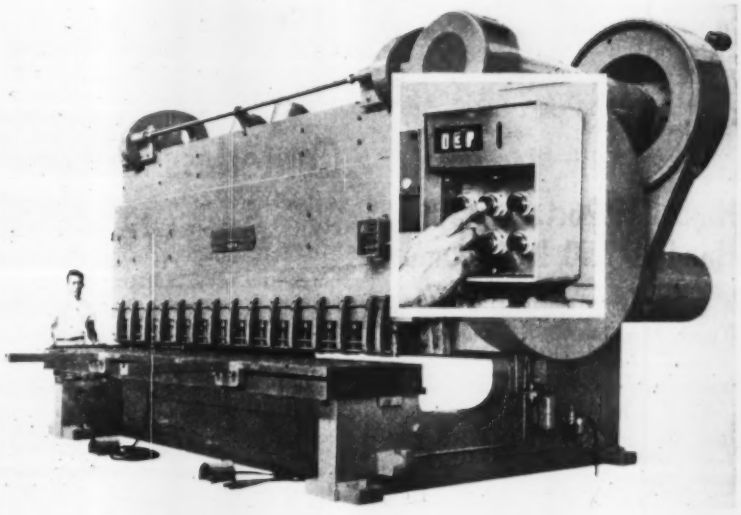


Shear Cuts 1¼ in. Mild Steel Plate, 14 ft Long

THE Series 15014 Cincinnati shear has a cutting capacity of 1¼ in. in mild steel plate 14 ft long. Features include hydraulic hold-downs, front operated power back gage, hinged back gage angle, and automatic pressure lubrication. The unit has a forged, alloy steel, eccentric shaft and all steel interlocked construction.

The new type power back gage has control buttons and gage setting indicating dials built into one unit (inset).

A large, easy to read counter type dial shows back gage setting in inches and sixty-fourths. The control unit is in front of the operator. A heavy steel frame protects the dial and control buttons against



damage from crane supported work.

For further information, *write* Cincinnati Shaper Co., P. O. Box 111, Cincinnati 11, Ohio.

Mold Release Oil Has Improved Properties

IF YOU have trouble with metal adhering to dies, you can eliminate it with a mold release oil. Sunoco says its product also results in lower casting porosity and brighter surfaces.

It also develops less fog during diecasting operations and minimizes wear on guide pins and bushings.

Improved results are claimed when the oil is used sparingly. The oil should be sprayed on, says the company.

For further information, *write* Industrial Products Dept., Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

Water Detection Device Protects Quench Tanks

A PROBE sealed into oil quenching tanks can be wired up to trigger an alarm or operate an automatic shutoff device to prevent water from building up to a dangerous level. It's part of the Ipsen Water Sentinel installation.

The probe acts as a detector: It's sensitive to water, which changes its electrical resistance, actuating the alarm or shutoff circuits.

For further information, *write* Ipsen Industries Inc., 715 S. Main St., Rockford, Ill.

High Lift Portable Crane Handles 750 lb Maximum

A PORTABLE crane developed by Thern Machine Co. lifts up to 750 lb loads 14 ft with the mast and boom fully extended.

Mast and brace telescope as one unit and are easily raised and lowered by a hand winch mounted on the mast. A positive spring loaded ratchet lock assures safe operation and holds the load in any position.

It can be moved through standard doorways (with boom retracted to horizontal position). Maximum lift capacity is 1250 lb with boom fully retracted to 34 in. and mast and brace fully retracted to lifting height of 8 ft 8 in. You can get the unit equipped with two 6 in. hard fiber wheels in front and two 4 in. hard fiber wheels in back. An alternate version has two 10 in. pneumatic wheels in front and two 6 in. semi-pneumatic casters in back.

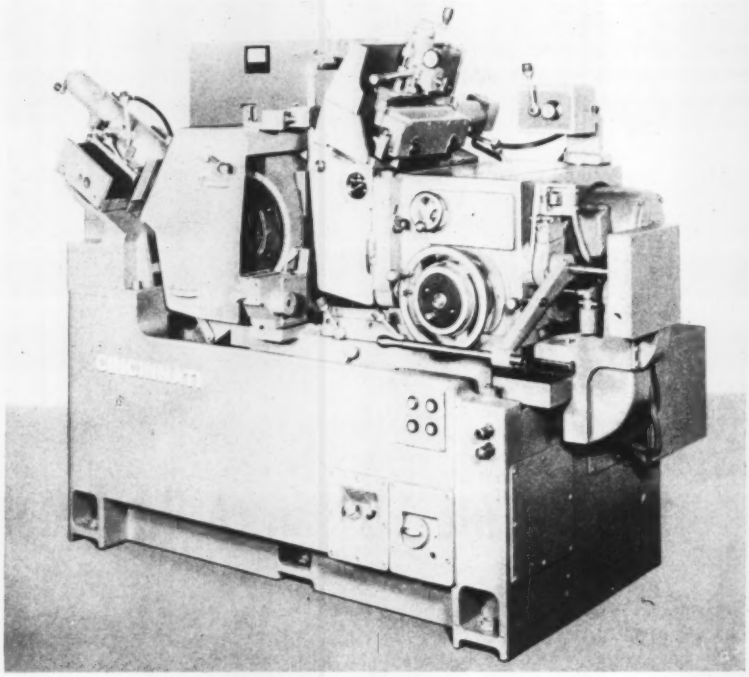
For further information, *write* Thern Machine Co., 3760 W. Fourth St., Winona, Minn.

Etchant Does Better Job

SEVERAL advantages of a new solid aluminum etchant (Pennsalt's AE-16S) over older types are cited by the maker: It is dustless, non-scaling, gives off no heat of solution, handles easier, and is lower in cost. Sludge is eliminated and the tank can be operated longer without cleaning.

Pennsalt says the compound produces a consistently durable satin etch.

For further information, *write* Metal Processing Dept., Pennsalt Chemicals Corp., 3 Penn Center, Philadelphia 2, Pa.



Centerless Grinder Does Job Shop Work

HERE'S a centerless grinder (Model 210-6) designed for short run work, quick and easy changeover, and operator convenience. The Centuramic 10 hp machine handles work up to 3 in. OD. Standard wheel width is 6 in. with provision for 8 in. widths. Speed is infinitely variable between 11 and 300 rpm.

The design permits the operator to stand close for dead passing or work blade adjustment. The regulating wheel truing attachment is inclined 20 degrees (opening the throat for easy access). There are no obstructions at any setup or operational position. Infeed adjustment wheels are available at both front and rear. Access to truing controls is good.

The mist control system creates a mechanical draft to prevent the

QUICK COMPARISON CHART

Some unique combinations of electrical and physical properties in Anaconda metals that may save you money—handle tough jobs better

Properties shown for precipitation-hardened condition—Heat-treatable alloys	ELECTRICAL CONDUCTIVITY % IACS	TENSILE STRENGTH psi	YIELD STRENGTH at 50% ext. under load, psi	ELONGATION % in 2 in. or 4xD	MACHINABILITY compared with F.C. Brass at 100	FORMS AVAILABLE
Chromium Copper-999 (Cu 99.05%, Cr .85%, Si .10%)	75	65,000	55,000	20	20	Rod Wire Tube Forgings Strip
Leaded Nickel Copper-831 (Cu 97.8%, Pb 1.0%, Ni 1.0%, P .2%)	55	80,000	70,000	7	80	Rod
Cunisil-837 (Cu 97.5%, Ni 1.9% Si .6%)	30 to 42	90,000	70,000	8	40	Rod

To give you a basis of comparison, here are properties of two standard Anaconda electrical coppers

ETP Copper—100 (Cu 99.9+%)	100	48,000	40,000	15	20	All mill forms
Leaded Copper—126 (Cu 99.0%, Pb 1.0%)	98	48,000	40,000	12	80	Rod bar

The values given above are intended as a guide to some unusual combinations of electrical and physical properties available among Anaconda alloys. If any of them gives you an idea for possible solution to a tough problem or indicates a way to cut costs without sacrificing quality or performance — see your American Brass representative for more details. Or send in this coupon today.

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Please send me more information about the following alloys:

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- ☐ Leaded Nickel Copper—831
- ☐ Cunisil—837
- ☐ Leaded Coppers
- ☐ Electrolytic Tough Pitch Copper—100

Name .....

Company .....

Street .....

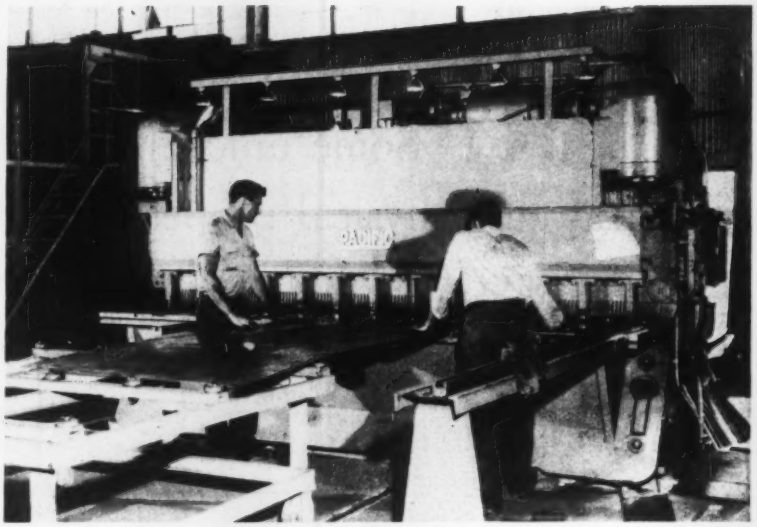
City ..... Zone ..... State .....

coolant from spattering the operator. The mist collecting nozzle automatically adjusts to wheel diameter as the wheel wears.

Cincinnati's Filmatic spindle bearings adjust for rough or finished cuts. The spindle rides on high pressure wedges of oil created by spindle rotation. The center mounted chain drive places the driving force squarely between the spindle bearings and applies the force in the same direction as the work force. Pinch-out is eliminated in through feed work.

You can automatically balance the wheel in seconds (on the machine). For taper correction, a swivel plate adjustment and clamp is at the front of the machine.

For further information, *write* Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio.

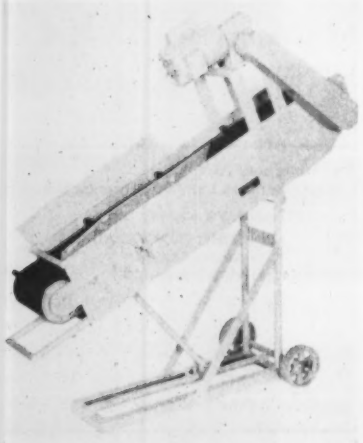


HYDRAULIC PLATE SHEAR WITH CUT CONTROL provides for adjustment of rake angle, knife clearance, hold-down hammering and tonnage, back gage setting, and back gage positioning. Thicknesses from 20 gage to 3/4 in. plate can be cut. It doesn't mark soft metals. Twist, bow, or camber of light gage metals is eliminated. The shear operates at up to 70 strokes a minute by remote pedal. For further information, **write** Pacific Industrial Mfg. Co., 848 49th Ave., Oakland, Calif.

Portable Conveyor Units Need Minimum Floor Space

PORTABILITY and minimum floor space requirements are features of the "Economy Senior" Series of part handling conveyor units. They're mounted on wheels, have telescoping handles, and can be moved easily by one man.

You can quickly adjust height and incline angle to meet job requirements. The series is made in standard belt widths of 4 through 24 in. with lengths from 4 through 10 in. Standard belt feed is 65 fpm (other speeds can be obtained by changing sprockets).



For further information, *write* Bosworth Mfg. Co., 34250 Mills Rd., Avon, Ohio.

Metal Polishing Machine Comes 12, 18 in. Wide

THE DUAL HEAD polishing machine made by Timesaver Sanders uses a wide abrasive belt head and a 3M Scotch-Brite wheel. You can use it for polishing metal sheets, flat stampings or extrusions, and strip stock. Material is fed onto a continuous conveyor belt that passes under both heads.

The abrasive belt head (mounted forward) removes surface scratches and scars while the rear Scotch-Brite head polishes. Hinged side panels provide access to the heads and abrasive belts can be changed in 2 to 3 minutes. The Scotch-Brite heads can be oscillated to prevent work marking. You can get the Speedbrite Model SB in 12 and 18 in. widths.

For further information, *write* Timesaver Sanders, Box 7446, Robbinsdale Station, Minneapolis 22, Minn.

Microhardness Tester Speeds Operations

A SEMIAUTOMATIC microhardness tester (Model LL Tukon) is designed to expedite testing of such things as cutting tool carbide tips, instrument pivots, electroplated surfaces, and sheet metal.

Indentation loads range from 25 to 1000 grams. Vertical capacity is 2½ in. The instrument has a microscope equipped with an X14 parfocalled dry objective for rapid scanning to determine test location. A calibrated X40 parfocalled dry

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STEEL

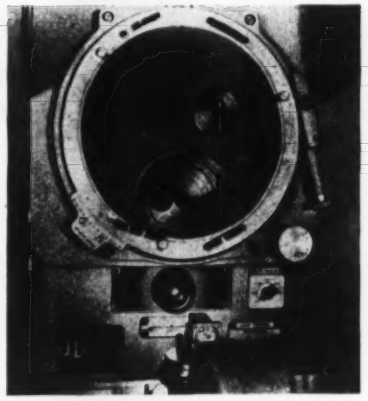
objective is used for rapid measurement of the length of hardness indentions directly in microns.

For more information, *write* American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn.

Unit Checks Superficial Scratches by Reflection

THE NORMAL reflection unit for the Jones & Lamson FC-14 and TC-14 optical comparators produces maximum reflectivity regardless of the inspected part's surface finish, says the company. Even superficial surface scratches can be checked accurately, it adds.

Depth of focus up to 0.1 in. can be obtained. Image size does not change during focusing. The high



intensity unit is not limited to low magnification projection lenses. Metallographs can be taken at X50 to determine carbonization and grain structure depth.

For further information, *write* Jones & Lamson Machine Co., Springfield, Vt.

Deep Hole Drilling Machine Comes Ready for Assembly

A PACKAGED, deep hole, drilling machine that you can assemble yourself is available. The package has six components that can be assembled into a precision unit capable of gun drilling or boring finished holes in one pass.

Basic advantages: 1. You can use your own labor and facilities for assembly. 2. Your own base can be used. (In some cases, an obsolete

Townsend distributors

bring your source of Cherry blind rivets a[illegible] close as your [illegible]

A reliable source of Cherry blind rivets and tools is waiting to serve you at the other end of your telephone line in more than 75 cities throughout the United States and Canada.

This network of Townsend jobber-distributors provides you with a ready inventory of self-plugging and pull-thru rivets together with a full range of hand and power-actuated setting guns and other installation tools.

In addition, the jobber-distributor in your area is qualified to give you expert assistance in selecting the proper size and style of rivet for your particular application.

Your jobber-distributor now stocks Townsend Cherry blind rivets in steel, aluminum alloy, Monel and copper—in 3/32", 1/8", 3/16", 1/4" and 5/32" diameters—in a wide range of grip lengths and a variety of head styles. For the name of the jobber-distributor nearest you, write to Engineered Fasteners Division, P.O. Box 71-C, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

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Cherry Rivet Division • Santa Ana, California

In Canada: Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario

URICK'S URITE GRAY IRON

Wt. 190 lbs.

Courtesy Euclid Division General Motors, Cleveland

GEARED TO THE JOB

URICK Foundry's integrated sales and engineering departments are geared directly to the production department —all working together to supply high quality gray iron castings with dimensional stability, uniform density, and high machinability.

From the planning stage, all the way to the finished part, URITE gray iron castings are designed and engineered to deliver greater tensile strength in relation to the service required, and in many cases with less weight. URITE gray iron is better because it is cast with fine flake graphite uniformly distributed throughout the iron matrix.

URICK'S modern facilities, manned by a competent co-operative team, produces quantities of high grade castings to meet the most demanding schedules.

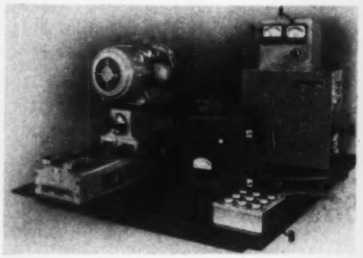
Contact URICK, the foundry that starts with "U" and stays with you. Write for advanced technical data about URITE gray iron castings.

URITE CASTINGS

URICK FOUNDRY

DEPT. S-2 ERIE, PENNSYLVANIA

NEW PRODUCTS and equipment



machine will provide a base.) 3. The components can be rearranged to fit many jobs.

Spindle speeds up to 10,000 rpm can be obtained with feed rates from 0.0001 to 0.025 in. per revolution. Mechanical models have strokes up to 60 in. Hydraulic units are available with strokes up to 24 in.

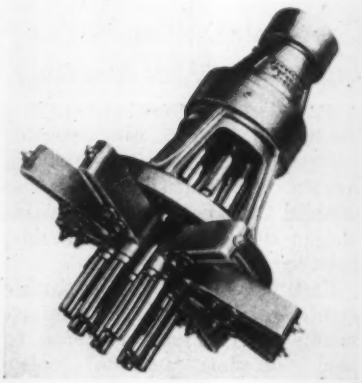
For further information, *write* Drillmation Co. Inc., 6500 E. Eleven Mile Rd., Center Line, Mich.

Nine Spindle Drill Head Handles Heavy Duty Jobs

THIS multiple drill head converts a single spindle drill press into an extra heavy duty multiple spindle unit. The Model (98-X) provides nine driving stubs (one is a center stub) and has a maximum capacity of nine $\frac{5}{8}$ in. drills in mild steel.

Maximum spindle center distance is $7\frac{3}{8}$ in. with a 1 in. minimum center distance. When used for multiple hole tapping, the unit has a capacity of nine $\frac{1}{2}$ in. taps in mild steel.

Plain Morse taper, vertical adjustable, and collet type spindle assemblies are available for the head. You can also get such accessories as



How to reduce furnace heat loss

Vertical pit-type carburizing furnace (9' x 24') lined with a refractory insulating castable made with LUMNITE cement. Furnace temperature 1800°F. Badall Engineering & Manufacturing Co., Hammond, Ind. Castable used: "Kast-O-Lite," product of A. P. Green Fire Brick Co., Mexico, Mo.

Refractory insulating concrete, made with LUMNITE calcium-aluminate cement, is being specified for linings in many types of industrial furnaces. It helps trim fuel costs by reducing heat loss and increasing heat storage. This helps shorten heating-cooling cycles and provides closer temperature control. In addition, the smooth, jointless concrete surface reduces air infiltration.

Construction with refractory concrete is fast, easy, economical. Linings can be cast in place, troweled or "gunited." Service strength is reached in 24 hours.

For convenience, manufacturers of refractories offer castables bonded with LUMNITE cement – packaged mixtures ready for use with just the addition of water. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

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Binks Airless spraying outfits are available for pumping paints direct from 55- or 10-gallon shipping containers to spray guns.

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you should know about

Airless spraying

Q: *Is airless atomization spraying the answer to all spray painting and coating problems?*

A: No! Not by a long shot.

Q: *Where, then, is airless spraying best used?*

A: It is excellent for indoor and outdoor painting maintenance or production work because there is virtually no overspray.

Q: *Does Binks manufacture airless spraying equipment?*

A: Yes. These rugged, dependable and mobile outfits incorporate the latest developments.

Q: *Why see Binks first when thinking of airless equipment?*

A: Binks offers you a complete line of spraying equipment. Only Binks offers you the opportunity to objectively compare airless with other techniques to select the equipment best suited to *your* requirements. Binks engineering assistance on finishing problems is likewise completely objective.

Q: *How can more facts be obtained on Binks airless units?*

A: Ask your Binks industrial distributor for Binks Bulletin A98-7. Or, call your nearest Binks Branch Office or write direct.

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Binks

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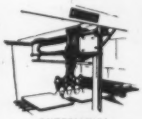
SPRAY GUNS



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NEW PRODUCTS and equipment

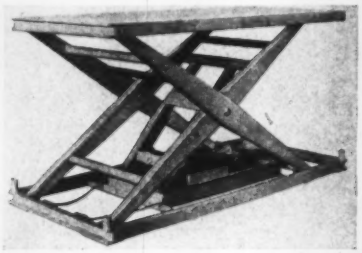
locating plates, cluster plates, and guide bar assemblies. The head has a 1:1 gear ratio and is recommended for speeds up to 2500 rpm.

For further information, *write* Industrial Sales Div., Cleveland Pneumatic Industries Inc., 64 Old Orchard, Skokie, Ill.

Scissors Type Lift Table Positions Long Loads

LIFTING, feeding, and work positioning of long loads for machine, process, or assembly operations can be simplified by the LP Series of scissors type lift tables.

You can get capacities from 1000 to 6000 lb, platform widths from 38 to 65 in., and platform lengths



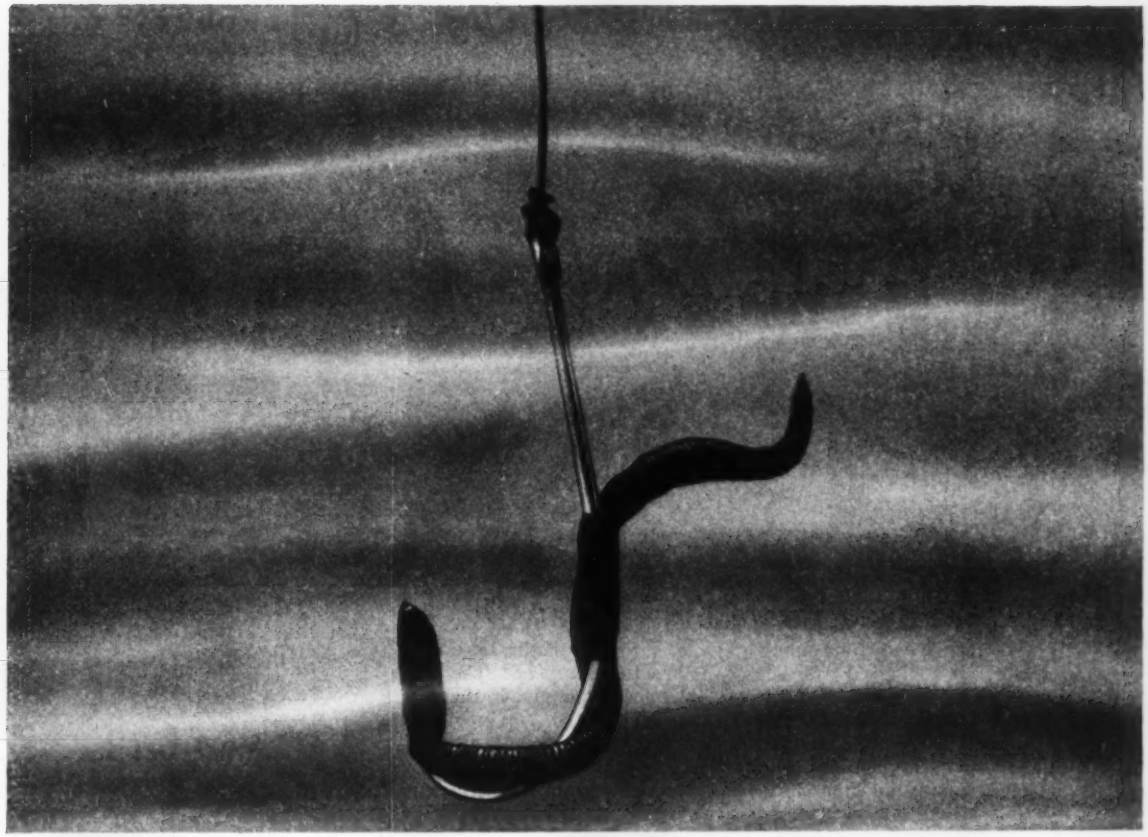
from 7 to 16 ft. Collapsed heights range from 9½ to 12 in. Maximum vertical platform travel on the standard model is 40 in. (60 maximum is available).

For more information, *write* Southworth Machine Co., 30 Warren Ave., Portland 2, Maine.

Heat Treating Furnace Has Improved Performance

THE "Buzzer" bench type oven furnace has an improved cast iron venturi burner and a hearth mix (in a special silicone carbide formula) that has increased shock limits and provides greater resistance up to 2000° F. The unit has an integral pilot for faster, simpler operation.

A higher powered venturi is used to entrain more primary air, provide higher flame temperatures, quicker combustion, and cleaner results, says the company. You can choose from six standard size mod-



Machine Tool Buyers:

Beware the fallacy of the "PAYOFF PERIOD" concept

The basic flaw in the "Payoff Period" approach, commonly used in making decisions on the replacement of capital equipment, is that, when used, there *is* no payoff.

The arbitrary selection of a payoff period can be little short of absurd, as is shown by the following example.

Hypothesis

(1) Management objective — 2 year Payoff
(2) Cost of New Equipment — $20,000
(3) Annual Savings Now — $5,000
(4) Projected Rise in Savings Each Year — $500

Decision

Postpone replacement for 10 years, when investment signal will come up.

Result

Avoidable costs incurred by postponement — $72,500

Secondary Result

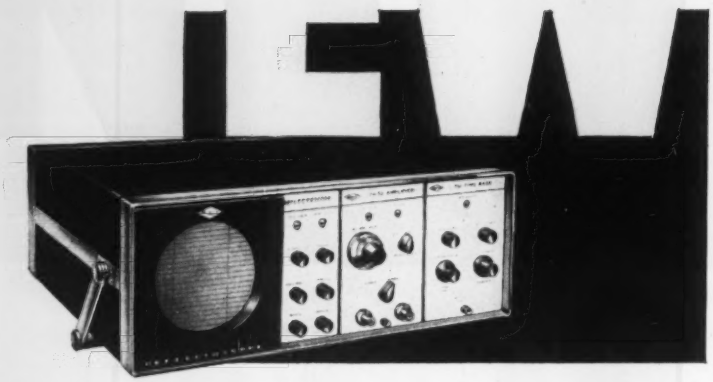
Projected cost of equipment in 10 years — $35,260. Postpone replacement for approximately 15 more years. *Ad Infinitum.*

Does Jones & Lamson offer a positive approach; a realistic, workable formula that is free from fallacies such as this? *Yes!* Write today for complete information.

the man who needs a new machine tool is already paying for it

JONES & LAMSON Machine Company, 517 Clinton St., Springfield, Vt.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools



UM ULTRASONIC REFLECTOSCOPE

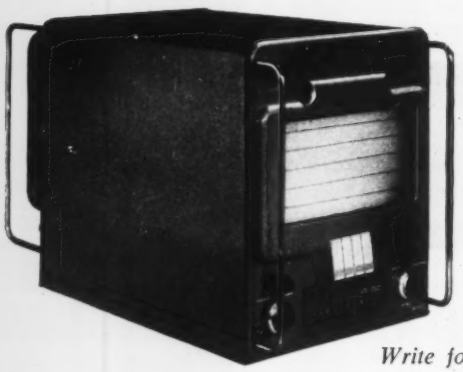
Now you get maximum economy, flexibility in ultrasonic testing equipment with Sperry's unitized Reflectoscope. The new UM design features low-cost interchangeable plug-in units so that various components can be accommodated. You get choice of frequency ranges, alarm and recording channels, attenuation correction, counting and totalizing channels. This economical building block method permits adding to instrumentation to meet increasing or changing testing requirements.

UI ULTRASONIC REFLECTOSCOPE

Latest concept in ultrasonic testing equipment. The most advanced instrument for lab and production line testing, compact for use on bridge or bench.

Plug-in receivers with frequency ranges from 1 to 25 mcs. Large 12" CRT with dual trace 2-color display. Double slope curves for distance amplitude correction — both near-zone and attenuation.

Exclusive features: Four instantaneous or continuous alarm channels with separate channel indication.



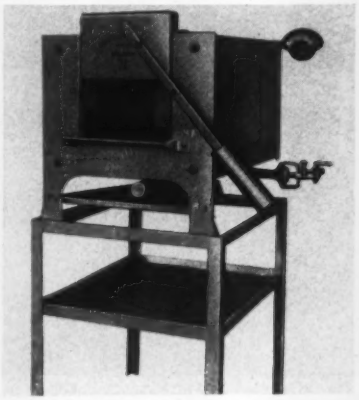
Write for descriptive literature.

Sperry Products Company

a division of Howe Sound Company

Danbury, Connecticut

NEW PRODUCTS and equipment



els. Completely packaged temperature controls can be furnished with the unit.

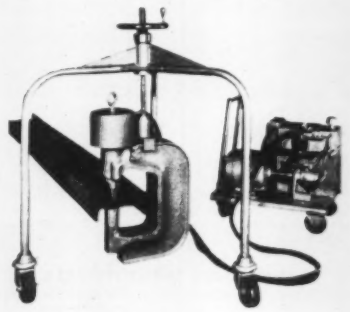
For further information, *write* Charles A. Hones Inc., 2473 Grand Ave., Baldwin, N. Y.

Press Throat Depth Ranges from 5½ to 25 in.

HOLES up to 1 1/16 in. in diameter can be punched in 7/8 in. mild steel with the Whitney portable hydraulic punches. Smaller diameters can be punched through heavier thicknesses.

Deep throat design permits punching to the center of the web on wide flange I-beams and channels.

Cutaway tools can also be used



to permit punching close to the leg. The line of punches is made in 20, 30, 50, 70, and 90 ton capacities. Throat depth ranges from 5½ to 25 in.

For further information, *write* W. A. Whitney Mfg. Co., 636 Race St., Rockford, Ill.

NEW literature

Write directly to the company for a copy

Eliminating Explosions

Bulletin 173 presents findings on the mechanism of explosions in pipelines and compressor starting air lines. The study discusses preventive measures that can be taken to eliminate explosions in air starting systems. Clark Bros. Co., Olean, N. Y.

Hoist Data

A booklet gives recommended minimum standard specifications for electric hoists of the wire rope type. Hoist Manufacturers Association, 1 Thomas Circle, Washington 5, D. C.

Mechanical Drive Variations

Catalog M-592 discusses styles, modifications, and accessories available in the line of Reeves mechanical, variable speed Motodrives. Reeves Pulley Div., Reliance Electric & Engineering Co., Columbus, Ind.

Barrel Finishing

A seven point system for scientifically controlled barrel finishing is detailed in "Carbotrol 7," a 36 page booklet. Advertising Branch, Carborundum Co., Niagara Falls, N. Y.

Steel Castings

"Steel Castings—Carbon and Low Alloy," lists chemical and physical data and properties on various alloys that are most commonly used for steel castings. Strong Steel Foundry Co., 33 Norris St., Buffalo 7, N. Y.

Industrial Fan Bulletin

Fundamental data relating to capacities and construction of a line of industrial fans are presented in a 28 page bulletin. Lehigh Fan & Blower Div., Fuller Co., Catasauqua, Pa.

Ultrasonic Cleaning

Bulletin 16-A describes the process by which high frequency sound waves impart intense scrubbing action to solutions to speed precision cleaning. It also describes compounds which have proved effective, and the types of operation ultrasonic cleaning does best. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Wire Design Handbook

A 22 page handbook describes the major types of wire available for component construction, finishes, wire sizes, and the variety of end treatments, threading and forming possible. Custom Design Dept., E. H. Titchener & Co., 57 Clinton St., Binghamton, N. Y.

Grinding Wheel Chart

A wall chart lists ten dos and ten don'ts for grinding wheel operator safety. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

ULTRASONIC THICKNESS GAGE

Now you can measure wall thickness accurately with Sperry's new direct reading ultrasonic thickness gage. Battery-operated, it is small and light enough (10 lbs.) to be carried anywhere — to inspect missile nose cones, other rocket components.

Using the pulse echo method, this new Sperry thickness gage works even where surfaces are not parallel, such as taper forgings. Easy-to-read meter is directly calibrated in inches, and alarm lamps are provided for go-no-go operation. Send to Sperry for a free bulletin giving more detailed information on the new ultrasonic thickness gage.

There is a full line of ultrasonic inspection instruments available from Sperry, for fourteen years leading designers and engineers of ultrasonic testing equipment. Call a Sperry engineer to help solve your ultrasonic testing problems.

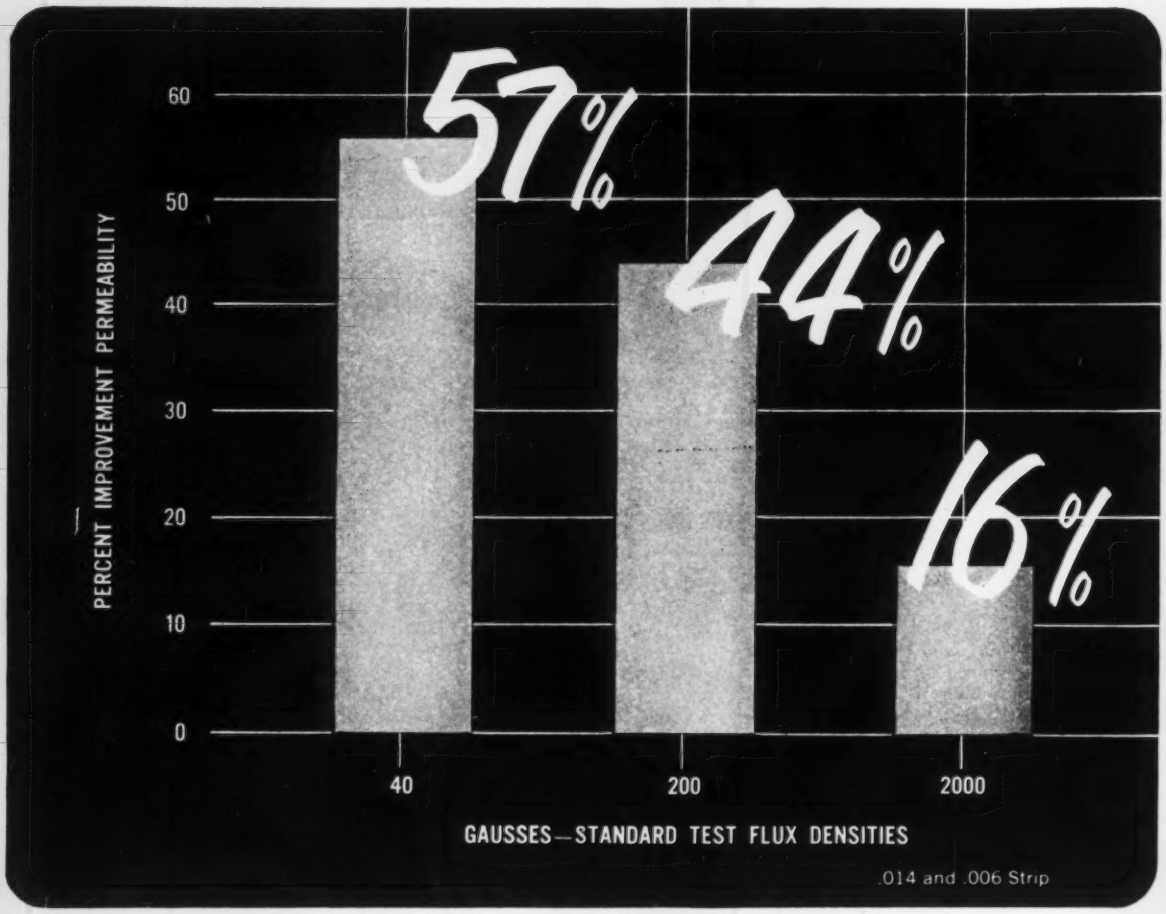
Write for descriptive literature.

Sperry Products Company

a division of Howe Sound Company

Danbury, Connecticut

Experience**—the added alloy in **A-L Electrical Steels



Greater permeability for Allegheny Ludlum's AL-4750...and it's *guaranteed*

promises more consistency, higher predictability for magnetic cores

AL-4750 nickel-iron strip now has higher *guaranteed* permeability values than ever before. For example, at 40 induction gausses AL-4750 now has 57% higher permeability than in the past, using the standard flux density test.

This greater permeability means better consistency and predictability for magnetic core users . . . and allows careful, high performance design.

This improvement in AL-4750 is the result of Allegheny Ludlum's continuing research on electrical alloys and nickel-bearing steels. Moly Permalloy has been similarly improved in permeability. A-L constantly researches silicon steels, including A-L's well-known grain-oriented silicon, Silectron, and other magnetic alloys.

Complete facilities for the fabrication and heat treatment of laminations are available at Allegheny Ludlum. And A-L's technical know-how guarantees you close gage tolerance, uniformity of gage throughout the coil and minimum spread of gage across the coil-width.

If you have a problem on electrical steels, laminations or magnetic material, call A-L for prompt technical assistance. Write for blue sheet EM-16 for complete data on AL-4750. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-241.***

7491

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STEELMAKERS TO THE ELECTRICAL INDUSTRY

Export distribution, Electrical Materials: AIRCO INTERNATIONAL INC., NYC 17

Export distribution, Laminations: AD. AURIEMA, NYC 4

Buyers See Six Month Steel Pinch

STEEL SHORTAGES will trouble metalworking firms for at least six months even if a strike settlement is reached before the Taft-Hartley injunction expires.

Inventories are at a postwar low—about 8 million tons—and badly unbalanced. Even if steelmakers start shipping at a high rate within a week or two, stocks will not rise significantly during the injunction period because of high consumption. Users will have to add more than 10 million tons to their inventories just to get them up to normal.

FABRICATORS MARK TIME— In spite of the steel industry's rousing recovery, operations in metalworking plants are lagging. There have been cutbacks since the strike was stopped and more are sure to come. Converters and fabricators are getting only material that was in process when the strike started. In most cases it's too little to permit resumption of full operations and too late to prevent further cutbacks.

AUTOMAKERS SCRAMBLE— To expedite shipments, automakers are continuing to make conversion deals. They're shipping slabs to mills that have had startup problems and hot bands to steelmakers whose semifinished stocks are depleted.

Although steel is trickling into plants that make automotive parts, it will be at least two weeks before assembly plant pipelines are filled. General Motors Corp. is recalling workers to its Part & Trim Div. but may not resume volume production until the first of next year. Some of GM's assembly plants are expected to start rolling by Dec. 1. Buick may be able to start buildups in the first week of December, Pontiac by Dec. 15.

SHUTDOWNS CONTINUE— Chrysler Corp., slated to close more of its assembly plants this week and next, hopes to step up production after Dec. 15. By staggering its schedules and juggling steel, Ford may avoid a complete shutdown. American Motors and Studebaker-Packard appear to be in good shape. Automotive production, now running at 64,000 cars weekly, will probably drop to about 50,000 as more Chrysler plants go down.

STEELMAKERS ON SPOT— While some consumers clamor for information about orders placed long ago, others insist that the mills take additional business. Most steelmakers are refusing to open their books for next year until they've substantially reduced their backlogs.

ANOTHER WALKOUT FEARED— One reason why buyers are so anxious to book ahead is that they're afraid the steelworkers' union will resume the strike. A leading electrical equipment manufacturer anticipates a 30 day strike early next year. Allowing for a 15 day startup, it figures that seven weeks' production could be lost in the first quarter.

The strike threat also bothers steelmakers. They're anxious to supply as many customers as they can before the injunction expires. Problem: How to make a wide range of sizes and shapes in a relatively short period and still get decent rollings.

PRODUCTION ZOOMS— Continuing its meteoric rise, production rocketed to 79 per cent of capacity last week—33.4 points above the previous week's revised rate. Output was about 2,237,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

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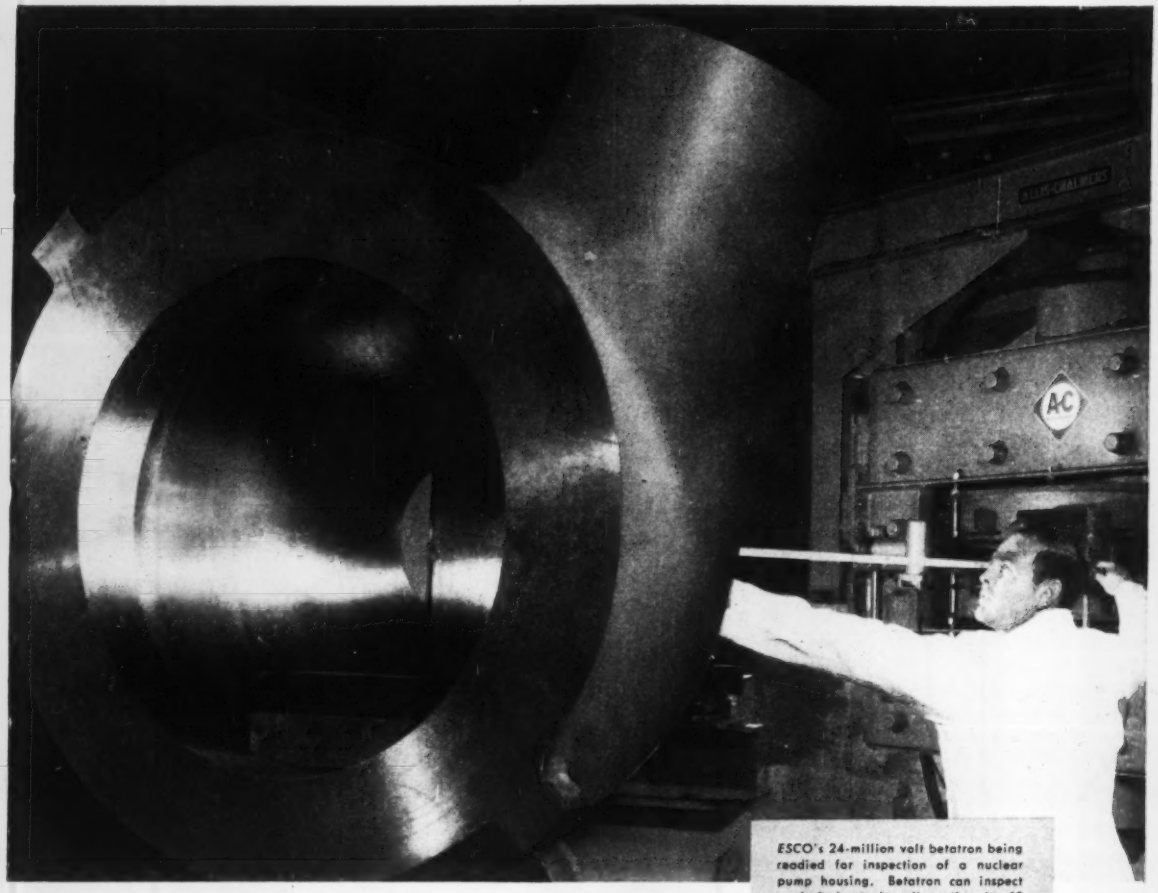
*Current prices were published in the Nov. 16 issue and will appear in subsequent issues.



ESCO's 24-million volt betatron being readied for inspection of a nuclear pump housing. Betatron can inspect a six-inch steel wall section in 60 seconds, a 16-inch wall in 1½ hours.

design problems can be simplified with

ESCO'S nuclear casting know-how

Solving tough casting problems has always been *ESCO*'s specialty. And that's why *ESCO* has been furnishing nuclear castings right from the start of the atomic energy program. Nuclear casting specifications and inspection requirements are thoroughly understood at *ESCO*.

ESCO has the facilities, as well as the technical know-how, for critical, exacting, casting jobs. Centrifugal, shell or static casting methods produce castings weighing several tons, or less than a pound, in more than 90 steel alloys. Testing facilities include X-ray, gamma ray, spectrograph, zyglo, dye penetrant, magnetic particle and betatron inspection, as well as complete chemical and mechanical laboratories.

Make an appointment with an *ESCO* metallurgical engineer today. He may be able to simplify and help solve your designing problems.

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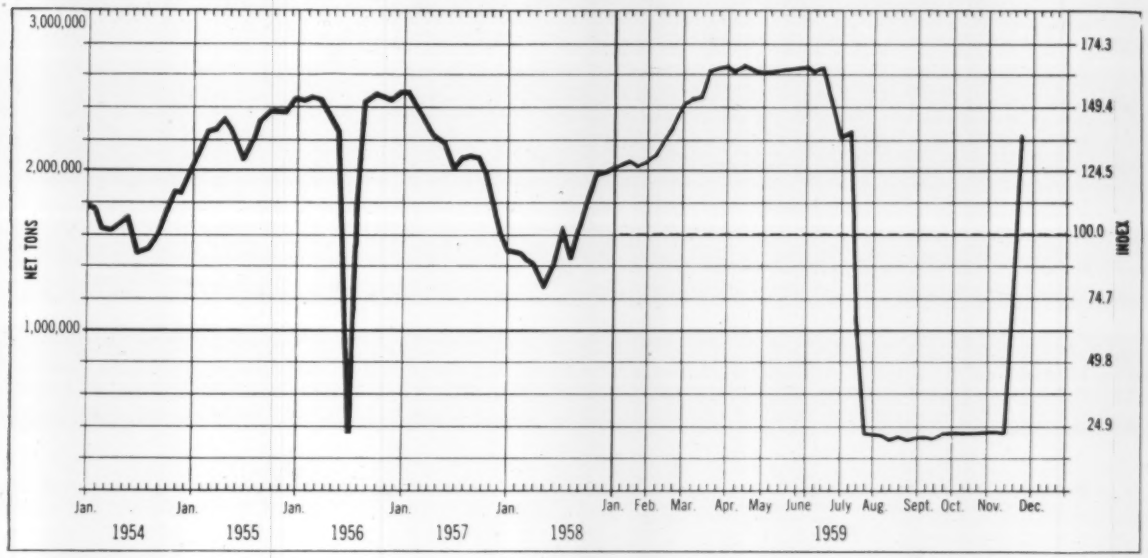

(Tonnage for week ended Nov. 22 estimated by STEEL; others reported and charted by American Iron & Steel Institute.)

SURGING steelmaking operations (79 per cent of capacity last week) are encouraging consumers to anticipate shipments of finished steel the rest of this year that only the most optimistic had thought possible when the Taft-Hartley injunction reopened the struck mills.

Less than two weeks after the strike's end, the furnaces were pouring steel at a rate of 2,237,000 ingot tons weekly at 79 per cent of capacity operations. Expectations are operations will rise to 85 per cent this week, and will probably hit 90 per cent early in December. The recovery is in line with STEEL's predictions (see Oct. 19, p. 183).

• **Tops Expectations**—While the recovery exceeds expectations of many observers, it's not as rapid as that after the 1956 strike. In the first poststrike week that year, the ingot rate rose from 16.9 per cent to 57.5, output totaling 1,415,000 tons. That compares with this year's first poststrike week operations of 45.6 per cent and output of 1,291,000 tons. In the second poststrike week, 1956, the rate hit 87.5 per cent with output amounting to 2,154,000 tons. That compares with last week's rate of 79 per cent and output of 2,237,000 tons. Note that while the per-

Steel Ingot Production—October, 1959

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1959						
January ...	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February ..	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr. ...	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr. ..	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo...	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
†July	4,540,182	66,433	94,489	526,025	5,227,129	41.7
*August ...	1,171,342	.....	.....	267,935	1,439,277	11.5
*September .	1,249,398	.....	.....	285,619	1,535,017	12.7
*3rd Qtr. ..	6,960,922	66,433	94,489	1,079,579	8,201,423	22.0
*9 Mo. ...	63,522,755	1,082,256	1,448,948	6,425,667	72,479,626	65.6
†October ..	1,377,000	.....	.....	308,000	1,685,000	13.4

Period	—OPEN HEARTH— Net tons	Percentage of capacity	—BESSEMER— Net tons	Percentage of capacity	—ELECTRIC— Net tons	Percentage of capacity	—TOTAL— Net tons	Percentage of capacity
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,912	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr. ..	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo. .	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
July	5,712,587	55.0	114,218	33.4	615,600	50.4	6,442,405	53.9
August ...	6,481,185	62.4	134,435	39.3	692,383	56.6	7,308,003	61.1
September..	6,769,660	67.3	103,194	31.2	759,518	64.2	7,632,372	66.0
3rd Qtr. ..	18,963,432	61.5	351,847	34.7	2,067,501	57.0	21,382,780	60.3
9 Mo.	52,756,296	57.7	985,023	32.7	5,393,948	50.1	59,135,267	56.2
October ..	7,795,541	75.0	148,458	43.4	895,779	73.3	8,839,778	74.0
November..	7,572,555	75.3	145,867	44.1	850,896	71.9	8,596,318	74.1
December ..	7,755,002	74.6	116,637	34.1	838,883	68.6	8,710,522	72.9
4th Qtr. ..	23,123,098	75.0	410,962	40.5	2,585,558	71.3	26,119,618	73.6
2nd 6 Mo..	42,086,530	68.3	762,809	37.6	4,653,059	64.1	47,502,398	67.0
Total	75,879,394	62.0	1,395,985	34.7	7,979,506	55.4	85,254,885	60.6

Note—The percentages are based on annual capacities as of Jan. 1, 1959: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons. In 1958, the capacity tonnages were: Open hearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric, and crucible, 14,393,740 net tons. Total: 140,742,570 net tons.
*Revised. †Preliminary.

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centage rate is lower this year, tonnage output is higher than in 1956.

Reason for the fast pickup in production: Open hearths and other equipment were in better condition than had been expected. Repairwork has been far less than most observers had thought would be likely. Some mills took the pains to keep open hearths warm during the strike, and they kept electrical controls covered and oiled. That maintenance is paying dividends. Relatively few producers have encountered difficulty in getting production back into full swing. On top of that, worker sentiment is reported much better than had been thought likely.

● **Shortages Still Felt**—Despite the fast pickup in steelmaking, operations at steel consumers' plants are still adversely affected by steel shortages. In another week or so, however, mill shipments should be moving in sufficient volume to provide much needed relief. There have been a number of manufacturing cutbacks since the steel strike was halted by the Taft-Hartley injunction, but it now looks as though the turn in the other direction is starting. In any case, some automotive companies are beginning to recall furloughed workers, indicating they anticipate early receipt of new steel supplies.

During the 116 day work stoppage, furnaces unaffected by the walkout poured a total of 5,950,000 net tons of ingots and steel for castings. That's less than one month's full production of the industry.

Output during October is estimated at 1,685,000 tons, bringing the total for the first ten months of the year to 74,164,626 net tons vs. 67,975,045 tons in the like 1958 period. Output in the first half of this year set a record at nearly 64.3 million tons.

● **Production Gains**—October output was slightly higher than the totals for either of the two preceding months, which also were affected by the strike. The September total was 1,535,017 tons, and that for August, 1,439,277. In October, 1958, the total was 8,839,788 tons.

The American Iron & Steel Institute's index of steelmaking for October stood at 23.7 in terms of average production in 1947-49. That

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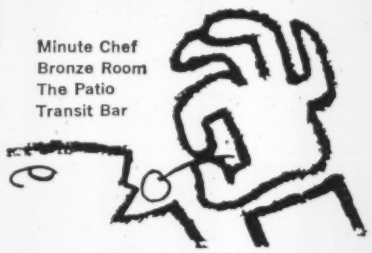

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compared with 22.3 for September, 1959, and 124.3 for October a year ago. The ten-month index was 106.3 vs. 97.4 for the same period last year.

Based on capacity of 147,633,670 net tons, operations in October averaged 13.4 per cent vs. 12.7 in September. The ten-month average was 60.3 per cent. For details see the table on Page 107.

Fastener Pricing Further Simplified by RB&W

Further simplification of pricing and nomenclature on industrial fasteners is announced by Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. Several months ago (see STEEL, July 20, p. 127), the company initiated a program aimed at simplifying the complicated discount pricing system used in the industry.

Effective with November shipments, suggestions from customers and distributors are incorporated in the new list of prices and discounts. Most pronounced need was for list prices having some degree of permanency, permitting customers to figure costs accurately, and distributors to carry the lists in catalogs, says John S. Davey, vice president-sales.

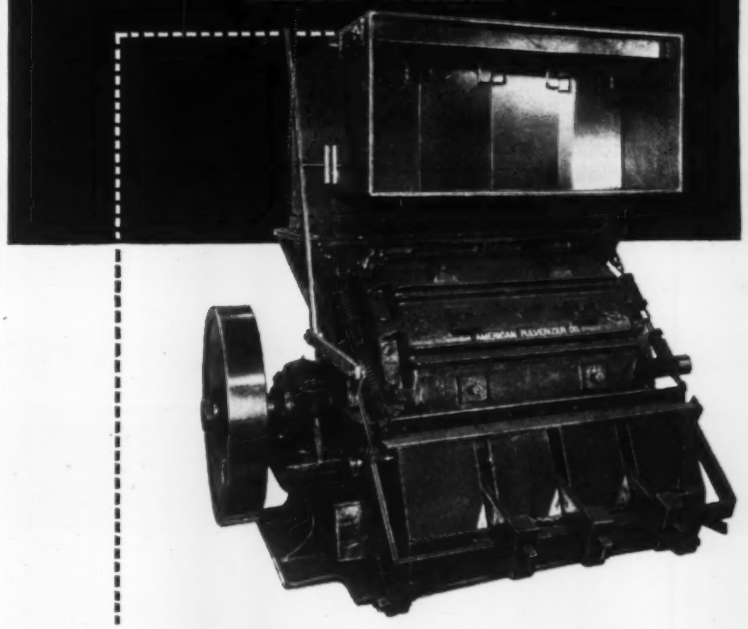
Some lists have been revised so that all bear a direct relation to cost.

Much traditional nomenclature has been dropped or changed. The term "screw" now describes a headed product furnished without a nut. The term "bolt" is reserved for a product furnished with a nut, whether shipped in bulk or in packages.

Duplicate lists and multiple names for identical hexagon-headed products have been eliminated. The term "hex screw" now means a product with a washer face and a controlled body tolerance. It replaces four other terms—cap screws; finished hex bolts, no nuts; hex heads, no nuts; and SF hex machine bolt, no nut, through 1 in. x 6 in.

The term "unfinished hex screw" describes a product having no washer face and having wider body tolerances. It replaces "hex heads, no nuts, larger and longer than

convert metal turnings into cash



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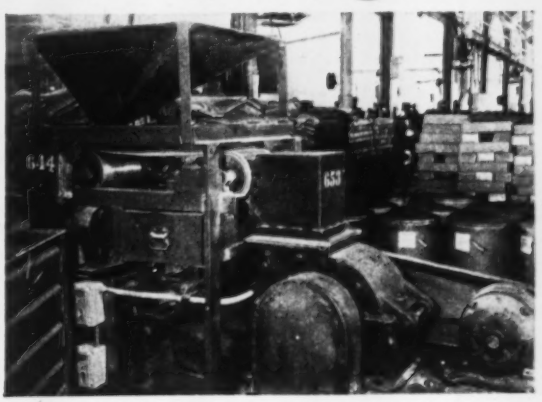

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ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
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1 in x 6 in., and hex machine bolts, no nuts."

Other changes: All lists, except step and elevator bolts, are now figured with hex nuts (square nuts are becoming obsolete); lists are made up so that hex screw and hex nuts can be ordered packaged separately instead of in the same package; plated lists are added for the popular products, the lists covering package and bulk orders; a new table facilitates computing of the prices of bolts longer than those listed.

Plates . . .

Plate Prices, Page 117

Platemakers are booked up three to four months ahead on sheared carbon plates, and six to eight weeks on clad plates. One eastern mill can promise nothing under eight weeks delivery on flange and dished heads.

The mills generally report strong pressure for long term requirements as well as near term needs. However, they are moving cautiously in accepting new tonnage.

An interesting twist: Seattle offered for sale 3000 ft of used 42 in. riveted steel pipe (190 tons) on which a bid of $2625 or $13.82 a ton was received. City officials had expected a bid of $836.

Platemakers are informing district sales offices what months of validation to put on the orders they have been holding. As fast as that can be done, they'll be sent to the mills and formally entered on order books. Defense orders have first call on production.

Titanium Alloy Prices Cut

Crucible Steel Co. of America, Pittsburgh, last week announced a reduction in the price of its new all-beta titanium alloy B-120VCA. The base price of billets and plates has been decreased $1 per pound; bars and strip are down $1.25 a pound and sheets and wire $1.50 a pound.

Dwight W. Kaufmann, Crucible's titanium product manager, stated reductions in production costs are being passed along to the Defense Department via the aircraft and missile industries.

Steel Bars . . .

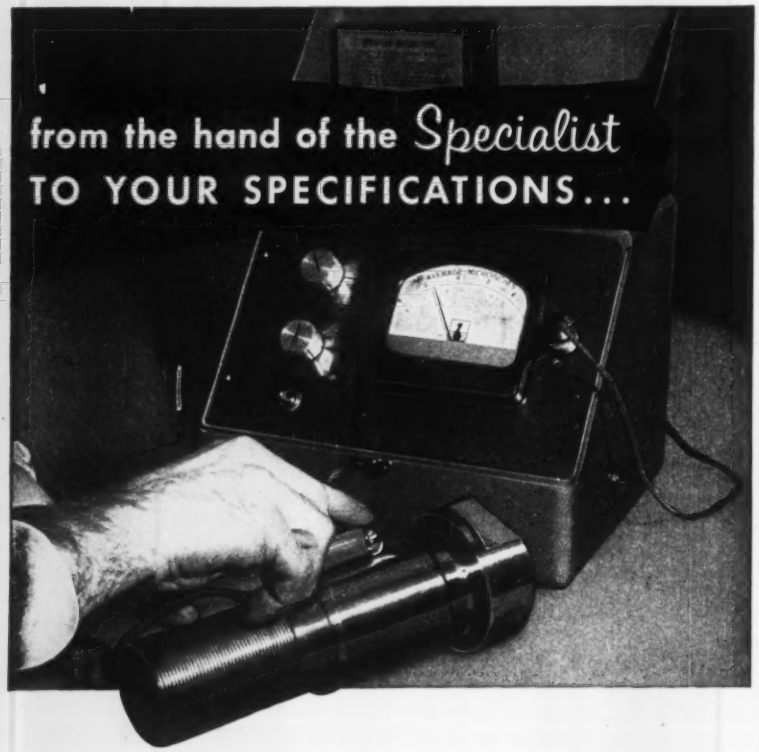
Bar Prices, Page 117

Producers of carbon steel bars are accepting few new orders. They won't be able to work off tonnage now on books for shipment this year until sometime in the second quarter, 1960. One large maker stated he couldn't possibly handle tonnage originally booked for December shipment before next April. Some mills, though, have space available in February hot alloy rolling schedules.

Resumption of operations at captive shops which were struck last summer, has eased the situation in cold drawn bars. When forced to suspend production, they had fairly good inventories of hot bars. As a result, they can now turn out cold drawn tonnage rapidly.

Orders taken during the strike, however, are consuming available stocks, with the result shops can't promise deliveries on new orders under two to three months, even should there be no further labor trouble.

At Pittsburgh, makers of cold finished bars are beginning to get shipments of hot bars from reactivated mills. So far, though, they



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have received only steel that was in process prior to the strike. Until they can accumulate inventory, they'll be unable to schedule full operations and recall all of their idled employees.

Because of the threat of a renewed strike after the injunction expires, cold finished producers wonder how much of the business they're booking is firm. Some believe that buyers are placing duplicate orders as a protective measure.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 118

Demand for concrete reinforcing steel bars is slackening seasonally, but some distributors and fabricators still are heavily booked up. Many are depending on imports, but are expecting supply relief shortly from the reactivated domestic mills.

Integrated producers booked cautiously during the strike period, but still built up substantial backlogs on which shipments will be made fairly close to delivery promises.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 118 & 119

Consumers are making life miserable for steel sales executives as they clamor for information about orders on books and insist that new orders be entered. Most sheetmakers are refusing to open their books for next year until they've substantially reduced their backlogs.

In hot and cold rolled and galvanized sheets, producers have enough work on order to keep them busy over the next six months. Centering attention on arrearages and inquiries which have accumulated during the strike, they are accepting little in the way of new tonnage, except for specialties.

Sheet consumers are turning to premium price tonnage to tide them over the supply crisis. One northern New Jersey drum manufacturer, for instance, bought 1500 tons of sheets from South Africa.

Top purchasing agents of the automotive companies are calling on the sheetmakers and urging them to ship as much as they can as fast as they can.

Because needed repairs to blast furnaces have temporarily reduced the steelmaking capacity of one important sheetmaker, it has little to offer but rolling space and labor. It's rolling slabs supplied by customers, but here too it's handicapped. Reason: One of its slab reheating furnaces is down for repairs.

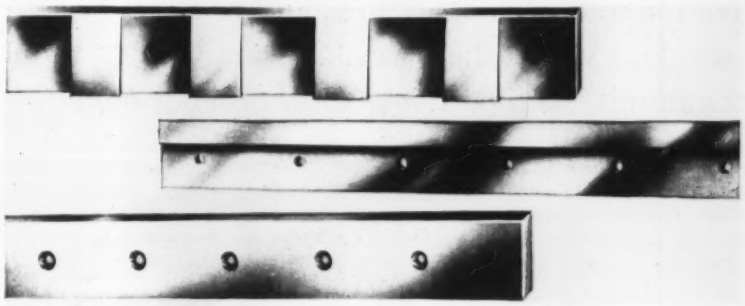
Another mill is expediting shipments through a conversion deal. It's getting hot bands and reducing them immediately.

A leading consumer estimates its sheet suppliers will average about 50 days' full production during the strike injunction period.

Imported Steel Tonnage Declines in Southwest

October steel imports fell sharply below the July, August, and September levels at Texas ports. The month's total was 42,754 tons vs. an average of 60,000 tons plus in the preceding three months.

A foreign mill lists slightly higher prices on steel for delivery in three to four months. The new base price for angles is $6.01—almost a



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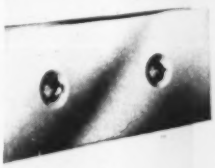

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$30 per ton increase since the low point last February. A foreign mill spokesman says imported steel sells for an average of about $15 a ton below U. S. mill prices.

Customary buyers of imported steel indicate they will move cautiously in placing late first quarter and second quarter orders. Speculation: Foreign prices may be slashed after U. S. mills catch up with demand.

Distributors . . .

Prices, Page 122

Steel service centers report supplies of flat rolled steel are low and probably will not be equal to demand for several months. Bars and structural shapes are in fair shape.

Many grades of steel tubing are in good supply, especially in the case of electricweld, aircraft alloy, and stainless steel, reports the Service Steel Div., Van Pelt Corp., Detroit. In the case of low carbon, seamless, and cold drawn buttweld, the situation is considerably less satisfactory. Present stocks are down 75 percent of prestrike levels.

"We feel the low point has not been reached. . . . we believe it will take several months to build inventories to the point where prompt delivery of some of the more popular sizes can be assured," says H. J. Hood, Detroit sales manager of the division.

Distributors in the Southwest plan a moderate restocking of inventories during the remainder of the year. They will move cautiously in purchases of foreign steel for late first quarter delivery. In the Pacific Northwest, imported steel is not exerting too much pressure on the market, although a substantial volume of European and Japanese steel products is being offered at Portland, Oreg., and in British Columbia.

Tubular Goods . . .

Tubular Goods Prices, Page 121

There probably won't be much new pipe tonnage entered on mill books the rest of this year. That's because order books are so heavily loaded with backed-up tonnage there'll be no room for additional entries in schedules for some time, although most pipe mills have had little trouble getting back into full production. One exception is the A. O. Smith Corp. plant in the Southwest which was idled during the strike by short steel supply. It won't get back into full production for several weeks.

Shipments of pipe to New England distributors are heavier. Most of the tonnage in that area moves through jobbers and the buildup of their pipe inventories will be pushed before other finished products. Considerable Canadian pipe eased the buttweld shortage in the area during the strike. Ending of the walkout at one Providence, R. I., plant opens up substantial warehouse volume, including pressure pipe.

While tubemakers are not having as much trouble with equipment as they had anticipated, the threat of a resumption of the steel strike in January is giving them some headaches. Because they're anxious to supply as many customers as they can before the Taft-Hartley injunction expires, they face a problem of making a wide range of sizes and shapes in a relatively short period, and still get decent rollings.

July and earlier orders are being processed and shipped now. Producers hope to ship August-September tonnage in December and October-November orders in January.

Public utilities are reported seeking to cover their first quarter requirements, but whether they'll be able to get much new tonnage in schedules for that period is uncertain.

Oil drilling operations were stepped up during the week ended Nov. 9. The Hughes Tool Co. survey showed 2111 rotary rigs operating vs. 2072 the preceding week.

Structural Shapes . . .

Structural Shape Prices, Page 117

Structural market activity is spotty. Various projects are being held up until the supply outlook is clarified. But some jobs that were suspended because of the strike or lack of steel, are starting up again—particularly in the case of fabricating shops that were strikebound since last summer. They have fairly well balanced steel inventories and are moving actively on held up work.

While most strikebound fabricating shops have reopened under the Taft-Hartley truce, some independent fabricators negotiating with

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unions other than the USW are still closed.

Demand is featured largely by bridgework. The outlook for 1960 construction needs is mixed. Substantial industrial and commercial building is expected, but highway work may be down because of cutbacks in federal funds.

Wide flange beams are in greatest demand. Producers are booked to capacity for most of next year's first half. Barring resumption of the strike, buyers who order standard structurals now should be able to get shipments in February.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

15,000 tons, $100 million mill expansion, Great Lakes Steel Corp., Detroit, to Structural Steel Div., the R. C. Mahon Co. and Whitehead & Kales, Detroit.

3750 tons, 14th St. bridge over the Potomac River, Washington, D. C., to Schacht Steel Construction Inc., New York.

2000 tons, helix houses, Naval radio installation, Cutler, Maine, to American Bridge Div., U. S. Steel Corp., Pittsburgh; Consolidated Constructors Inc., Portland, Maine, general contractor.

1265 tons, six highway bridges, multiple composite beam spans, Saratoga County, New York, to Ernst Iron Works, Buffalo; Lane Construction Co., Meriden, Conn., general contractor.

915 tons, three highway bridges, including one, 6-span, one, 4-span, and one, 4-span composite wide flange beam structures, Interstate Route 505, Jefferson County, New York, to Ernst Iron Works, Buffalo; Lane Construction Co., Meriden, Conn., general contractor.

650 tons, Willamette River bridge, Oregon State project, to Isaacson Iron Works, Seattle; Peter Kiewit Sons Co., Vancouver, Wash., general contractor at $2,128,295.

575 tons, state bridgework, Dauphin County, Pennsylvania, through G. A. and F. C. Wagman, Dallastown, Pa., to Harris Structural Steel Co., New York.

525 tons, three, 3-span and one, 5-span composite wide flange beam bridges, Putney, Vt., Contract 1, to American Bridge Div., U. S. Steel Corp., Pittsburgh; Lane Construction Co., Meriden, Conn., general contractor.

350 tons, substation steel, reported to Creamer Industries, Ft. Worth, Tex., low at $109,348, for Bonneville Power Commission, Portland, Oreg.

280 tons, three state bridges, Bedford, N. H., to West End Iron Works, Cambridge, Mass.; Palazzi Corp., Concord, N. H., general contractor.

255 tons, one, 4-span composite wide flange beam bridge, Putney, Vt., Contract 3, to American Bridge Div., U. S. Steel Corp., Pittsburgh; Lane Construction Co., Meriden, Conn., general contractor.

140 tons, state highway bridge, Norwich, Conn., to McDermott Steel Specialties Co., East Haven, Conn.; Bingham & Chilkpitt, Eastford, Conn., general contractor; reinforcing bars to U. S. Steel Supply Div., U. S. Steel Corp., Boston.

135 tons, state highway bridge, Stockton Springs, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Bridge Construction Co., Augusta, Maine, general contractor.

STRUCTURAL STEEL PENDING

1800 tons, two hangars, shop and office buildings, Andrews Air Force Base, Maryland; bids Dec. 23, U. S. Engineer, Washington, D. C.

985 tons, state bridgework, Monroe County, Pennsylvania, J. H. Beers, Bangor, Pa., low on the general contract; 700 tons of reinforcing bars also required.

175 tons, also 40 tons of reinforcing steel, Washington State steel truss bridge, Ferry County; bids to Olympia, Wash., Dec. 1.

120 tons, two wide flange beam bridges, Newport-Troy, Vt.; bids Dec. 4 to Montpelier, Vt.

Unstated, steel frame warehouse and office, U. S. Gypsum Co., Seattle; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

995 tons, five state highway structures, Seymour, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Mariani Construction Co. Inc., New Haven, Conn., general contractor; 395 tons, steel piles, to Bethlehem Steel Co.

400 tons, helix houses, radio station installation, Cutler, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Consolidated Constructors Inc., Portland, general contractor.

200 tons, three state highway structures and box culvert, Bedford, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Maine; the Palazzi Corp., Concord, N. H., general contractor; 260 tons, steel bearing piles, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, plant addition, St. Joe Paper Co., Newark, N. J., to American Steel Engineering Co., Philadelphia, through William F. Blanchard, general contractor; 190 tons of structurals for this project were recently placed with Belmont Iron Works, Eddystone, Pa.

113 tons, local school and state unemployment commission building, Helena, Mont., to Bethlehem Steel Co., Pacific Coast Div., Seattle.

REINFORCING BARS PENDING

8850 tons, John Day Dam; bids in to the U. S. Engineer, Walla Walla, Wash., Nov. 19; earlier estimate was 14,000 tons.

2000 tons, also girders and piling; bids to the State Highway Commission, Olympia, Wash., for a Seattle freeway, postponed from Nov. 17 to Nov. 24.

170 tons, also lump sum for unstated tonnage of structurals, Montana State 730 ft Yellowstone River bridge; bids to Helena, Mont., Nov. 18.

Unstated, pumphouse, also gates and trash racks, Hanford Works; bids in to Kaiser Engineers, Richland, Wash.

Unstated, precast concrete So. M. Street Bridge; bids to Tacoma, Wash., Nov. 23.

Unstated, eight cubicle additions to Glasgow (Mont.) Air Base ammunition magazine; bids to U. S. Engineer, Walla Walla, Wash., Dec. 9.

PLATES . . .

PLATES PLACED

300 tons, 750,000 gallon elevated steel water-tank for Renton, Wash., to Chicago Bridge & Iron Co., Seattle.

235 tons, high tensile, Navy Purchasing Office, Washington, D. C., to Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., Wilmington, Del.

225 tons, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.; 170 tons, cold finished carbon sheets, to Weirton Steel Co., Weirton, W. Va.

175 tons, General Stores Supply Office, Navy, Philadelphia, to C. Itoh & Co. Inc. (America), New York.

165 tons, General Stores Supply Office, Navy, Philadelphia, to Pines Steel Div., South Asia Steel Corp., New York.

80 tons or more, pallet shipping boards, to Hydraulic Supply Mfg. Co., Seattle.

PLATES PENDING

235 tons, carbon, General Stores Supply Office, Navy, Philadelphia; bids Nov. 24.

227 tons, carbon, General Stores Supply Office, Navy, Philadelphia; bids Nov. 30.

145 tons, aluminum alloy, Naval Supply Center, Oakland, Calif.; bids in.

115 tons, carbon, General Stores Supply Office, Navy, Philadelphia; bids Nov. 24.

RAILS, CARS . . .

RAILROAD CARS PENDING

Seaboard Airline, 300 covered hoppercars and 500 open triple hoppercars.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

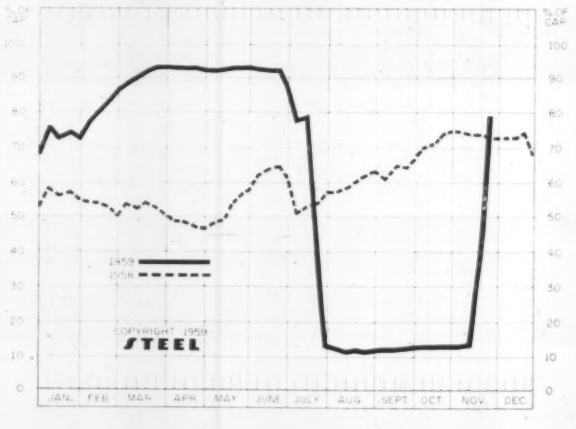
	Week Ended Nov. 22	Change	Same Week 1958	Same Week 1957
Pittsburgh	76	+38.5*	67.5	80
Chicago	77.5	+31.5*	85	77.5
Eastern	80	+42*	71	82.5
Youngstown	92	+59.5	61	70
Wheeling	87.5	+17	85	64
Cleveland	79.5	+35*	70	71.5
Buffalo	97.5	+12.5	78	83
Birmingham	77.5	+62.5	58	60.5
Cincinnati	88	+10	82	86
St. Louis	94	0*	86	89
Detroit	75.5	+29*	103	92
Western	78	+50	78	86
National Rate	79.0	+33.4*	75	76.5

INGOT PRODUCTION

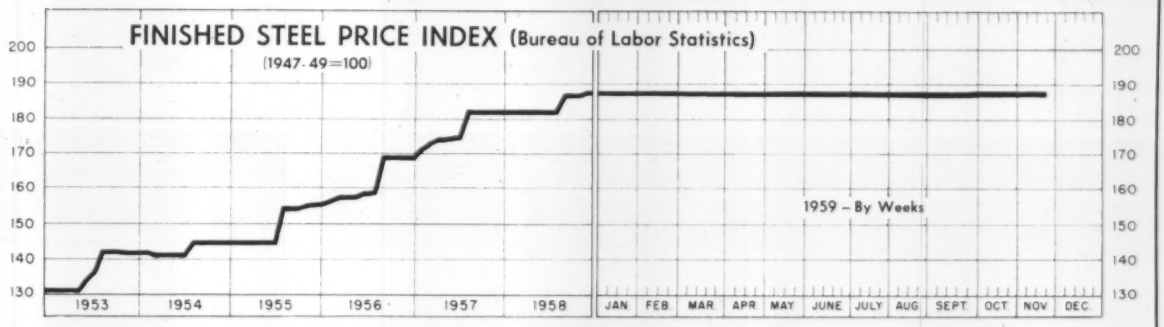
	Week Ended Nov. 22	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	139.3†	80.4	23.1	124.5
NET TONS (In thousands)	2,237†	1,291	371	2,000

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Nov. 17, 1959	Week Ago	Month Ago	Oct. Index	Year Ago
186.8	**186.8**	**186.8**	**186.8**	**186.9**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 17

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.735
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.420
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.742
Woven Wire Fence (20-rod roll)	21.765

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 18 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.95
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	44.83	45.33	44.33	40.67	33.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Nov. 18 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods ½-⅝" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	Nov. 18 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld.,Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

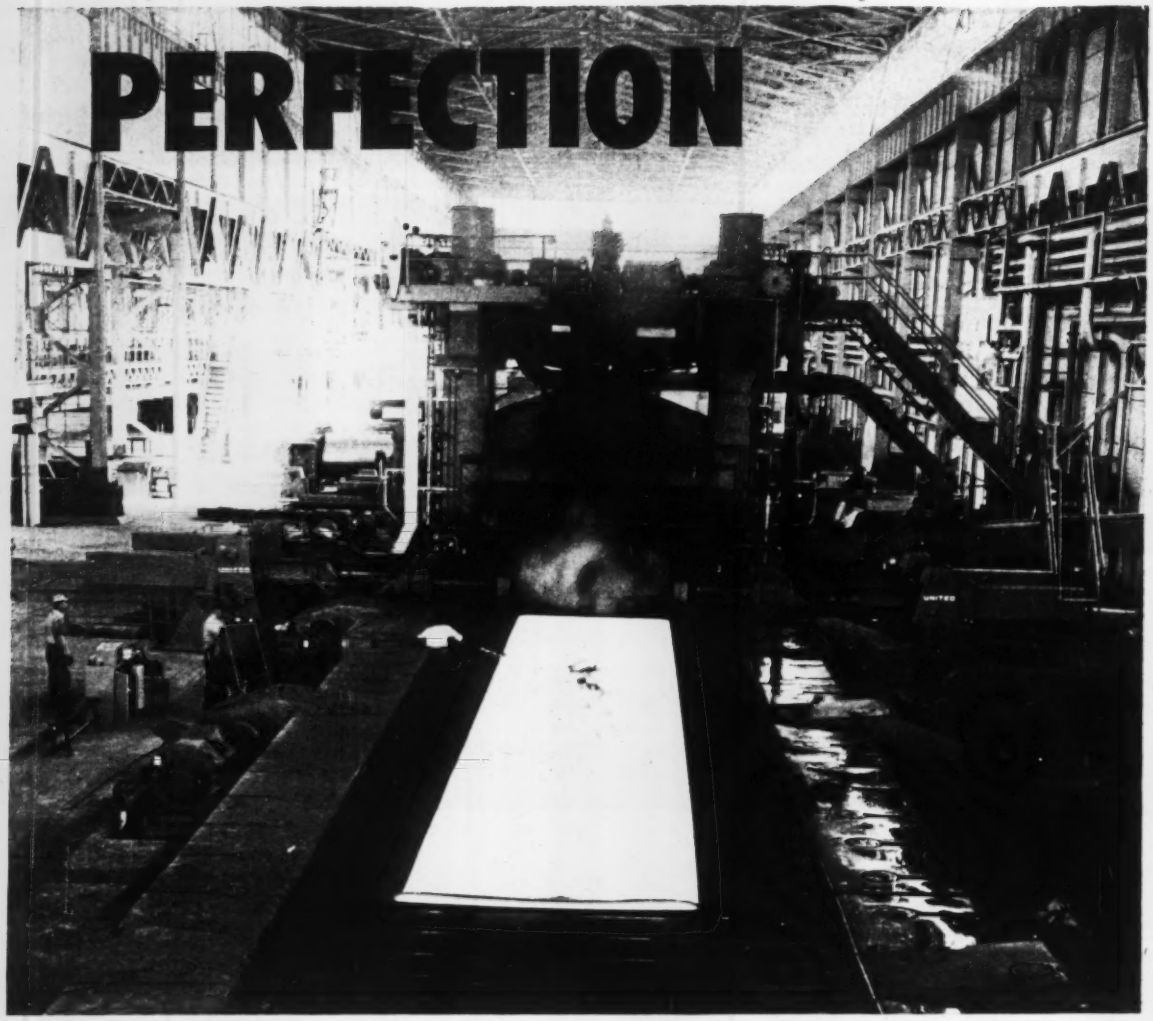
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$45.50	$45.50	$44.50	$42.50	$34.50
No. 1 Heavy Melt, E. Pa.	45.00	45.00	45.00	37.00	33.50
No. 1 Heavy Melt, Chicago	44.00	45.50	43.50	42.50	33.00
No. 1 Heavy Melt, Valley	45.50	44.50	44.50	43.50	34.50
No. 1 Heavy Melt, Cleve.	42.50	41.50	41.50	40.00	32.50
No. 1 Heavy Melt, Buffalo	39.50	33.50	33.50	35.50	32.50
Rails, Rerolling, Chicago	64.50	64.50	64.50	62.00	54.50
No. 1 Cast, Chicago	57.50	57.50	57.50	45.50	39.50

COKE, Net Ton

Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



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Germany

Steel Prices

Mill prices as reported to STEEL, Nov. 18, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 118; footnotes, page 120.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)

Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bartonville,Ill. K4 ... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 .. 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 .... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 .... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 .. 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 .... 99.50
S.SanFrancisco B3 .... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 .. $119.00
Bridgeport,Conn. C32 .. 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 .... 119.00
Conshohocken,Pa. A3 .. 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 .... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 .... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 .. 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2.. 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 .... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 119.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5 W14 119.00
S.Duquesne,Pa. U5 ... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 .. 122.50
Warren,O. C17 ..... 122.50

SKELP

Aliquippa,Pa. J5 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS

AlabamaCity, Ala. R2 .. 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton Ill. L1 ..... 6.60
Bartonville,Ill. K4 .... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1.. 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 .... 7.20
Portsmouth,O. P12 .... 6.40
Roebling,N.J. R5 .... 6.50
S.Chicago Ill. R2 W14 .. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 .. 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 .... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 .... 5.60
Lackawanna,N.Y. B2 .. 5.50
Los Angeles B3 ..... 6.20
Minnequa,Colo. C10 .... 5.50
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 .... 5.55
Portland,Oreg. O4 .... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5 W14 5.50
S.SanFrancisco B3 .... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 .... 6.20
Weirton,W.Va. W6 .... 5.50

Wide Flange

Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 .... 6.45
IndianaHarbor Ind. I-2.. 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 .... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W16 .... 5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14.. 6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 .... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 .... 8.15
Lackawanna,N.Y. B2 .. 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14.. 8.05
S.SanFrancisco B3 .... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange

Bethlehem Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 .. 8.10
Munhall Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling, Ill. N15 ..... 7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .... 5.55
Ind.Harbor,Ind. I-2 .... 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 .. 5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .... 6.50
Lackawanna,N.Y. B2 .. 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago Ill. I-2, U5 .. 6.50
Weirton,W.Va. W6 .... 6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 .. 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 .. 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. C22 .... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 .... 5.30
Conshohocken,Pa. A3 .. 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 .. 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity Ill. G4 .... 5.40
Harrisburg,Pa. P4 .... 5.30
Houston S5 ..... 5.40
Ind.Harbor Ind. I-2, Y1 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 .. 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 .... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14.. 5.30
SparrowsPoint,Md. B2 .. 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 .... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 .... 5.30
Youngstown(27) R2 ... 5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 .. 7.05

PLATES, Wrought Iron

Economy,Pa. B14 .... 13.55

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.95
Ashland Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairtown,Pa. U5 ..... 7.95
Claymont,Del. C22 .... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville Pa. L7 .... 7.95
Conshohocken,Pa. A3 .. 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 .. 8.75
Gary,Ind. U5 ..... 7.95
Geneva Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind Harbor Ind. I-2, Y1.7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon Pa. S3 ..... 7.95
S.Chicago Ill. U5 W14.. 7.95
SparrowsPoint,Md. B2.. 7.95
Warren O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, Alloy

Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. C22 .... 7.50
Coatesville Pa. L7 .... 7.50
Economy,Pa. B14 ..... 7.50
Farrell Pa. S3 ..... 7.50
Fontana,Calif K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind Harbor Ind. Y1 .... 7.50
Johnstown Pa. B2 ..... 7.50
Lowellville O. S3 ..... 7.50
Munhall Pa. U5 ..... 7.50
Newport Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon Pa. S3 ..... 7.50
S.Chicago Ill. U5, W14.. 7.50
SparrowsPoint Md. B2.. 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES

Cleveland J5 ..... 6.375
Conshohocken,Pa. A3 .. 6.375
Ind.Harbor,Ind. I-2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 .. 5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. c.l. R2 .... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 .. 5.675
Aliquippa,Pa. (9) J5 .. 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 .. 5.675
Birmingham(9) C15 .. 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa. (9) U5 .. 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 .. 5.675
Emeryville,Calif. J7 .. 6.425
Fairfield,Ala.(9) T2 .. 5.675
Fairless,Pa.(9) U5 .... 5.825
Fontana,Calif.(9) K1.. 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 5.675
Johnstown,Pa.(9) B2 .. 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5.. 5.925
Lackawanna(9) B2 .... 5.675
LosAngeles(9) B3 .... 6.375
Massillon,O.(23) R2 .. 6.15
Midland,Pa.(23) C18 .. 6.025
Milton Pa. M18 ..... 5.825
Minnequa,Colo. C10 .. 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8.. 6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 .... 6.425
Riverdale,Ill.(9) A1 .. 5.675
Seattle A24, B3, N14.. 6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5.. 5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15.. 5.675
Sterling,Ill.(9) N15 .... 5.775
Struthers,O.(9) Y1 .... 5.675
Tonawanda,N.Y. B12 .. 5.675
Torrance,Calif.(9) C11 .6.375
Warren O. C17 ..... 6.052
Youngstown(9) R2,U5 .. 5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .... 6.725
Bethlehem,Pa. B2 .... 6.725
Bridgeport,Conn. C32 .. 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 .... 6.725
Clairton,Pa. U5 ..... 6.275
Detroit S41 ..... 6.725
Economy,Pa. B14 .... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 .... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .... 6.725
KansasCity,Mo. S5 .... 6.975
Lackawanna,N.Y. B2.. 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 .... 6.725
Pittsburgh J5 ..... 6.725
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 .... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 ..... 8.30
Bessemer Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 .... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 .... 8.55
Lackawanna,N.Y. B2 .. 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 8.30
S.Duquesne,Pa. U5 .... 8.30
S.SanFrancisco B3 .... 9.05
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 .. 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9)S5 .. 5.925
Lackawanna(9) B2 .... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 .... 5.675
Tonawanda,N.Y. B12 .. 5.675

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 .. 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 6.375
Portland,Oreg. O4 .... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 .... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including loaded extra) Carbon

LosAngeles P2, S30 .. 11.75*

Alloy

Ambridge,Pa. W18 .. 10.175
BeaverFalls,Pa. M12.. 10.175
Camden,N.J. P13 ... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 .... 10.175
Newark,N.J. W18 .... 10.35
SpringCity,Pa. K3 .... 10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 .. 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2.. 7.65
Hartford,Conn. R2 .... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 .... 9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 .... 8.20
Massillon,O. R2, R8 .... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 .. 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 .... 7.90
Putnam,Conn. W18 .... 8.20
Readville,Mass. C14 .... 8.20
S.Chicago,Ill. W14 .... 7.65
SpringCity,Pa. K3 .... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 .. 8.15
Youngstown F3, Y1 .. 7.65

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy

Ambridge Pa. W18 .... 9.025
BeaverFalls Pa.M12,R2 9.025
Bethlehem,Pa. B2 .... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 .... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 .. 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 .... 9.025
Hammond,Ind. J5, L2.. 9.025
Hartford,Conn. R2 .... 9.325
Harvey,Ill. R5 ..... 9.025
Lackawanna,N.Y. B2.. 9.025
LosAngeles P2, S30 .... 11.00
Mansfield,Mass. B5 .... 9.325
Massillon,O. R2, R8 .. 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 .... 9.225
S.Chicago,Ill. W14 .... 9.025
SpringCity,Pa. K3 .... 9.20
Struthers,O. Y1 ..... 9.025
Warren,O. C17 ..... 9.025
Waukegan,Ill. A7 ..... 9.025
Willimantic,Conn. J5 .. 9.325
Worcester,Mass. A7 .. 9.325
Youngstown F3, Y1 .. 9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 .....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 ....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W. Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 ..6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 .....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..6.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10(type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ..8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M1 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Younstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie, Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) P6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19.70	20.20	20.70	15.70††	
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	178
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7 ..$10.30

NAILS, Cut (100 lb keg)

Wheeling,W.Va. W10 ..$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
Chicago Hts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

	An'ld Galv.	Stone
WIRE (16 gage)		
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.SanFran.	C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

	An'ld Galv.	Col.
WIRE, Merchant quality (6 to 8 gage)		
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansCity(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)	N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. ‡10c. ‡‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
⅝ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0
Undersize Body (rolled thread)	
½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Large diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. (ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
⅞ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1⅛ in., incl.	56.0
1⅛ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1⅛ in. incl.	56.0
1⅛ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:	
6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ⅛ in., larger 7/16 in. and smaller by 6 in. and shorter: 15% off list. 12.85,

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1⅝	13	35.94	42.12	31.89
2	13	40.23	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2⅝	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+2.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	12.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	35.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	43.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	85.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	43.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	$36.10	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.840

Tool steel producers include: A4, A5, B2, B5, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	9.99	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.87	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[c]	8.90[d]	13.10#	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[3]	12.95[3]	16.35	9.00[3]	9.10[3]	11.30[3]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[c]	8.64[d]	11.25#	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80[a]	9.31[b]	10.47	....	10.32[c]	8.70[d]	11.49#	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$16.00-$16.50*
Domestic, concentrates f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh).	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers: all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	35.70-52.20†
Bronze, 5000-lb lots	53.50-57.50†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	54.00-58.30†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-55.00
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	20.70-33.90‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr, min, metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven foundry Coke

Birmingham, oven	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.60	....	$6.55	$6.46	$6.95
Bar Size Angles	6.60	....	6.55	6.46	6.95
Structural Angles	5.93	....	5.88	5.78	6.18
I-Beams	5.93	....	5.88	5.78	6.18
Channels	5.93	....	5.88	5.78	6.18
Plates (basic bessemer)	6.30	....	6.25	6.15	6.55
Sheets, H.R.	9.50	....	9.45	9.35	9.75
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	10.40	....	10.35	10.25	10.75
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	10.55	....	10.50	10.40	10.80
Sheets, C.R. (drawing quality)	12.00	....	12.95	12.85	13.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	....	25.28	24.99	26.68
Barbed Wire (†)	8.25	....	8.20	8.10	8.50
Merchant Bars	6.58	....	6.53	6.44	6.81
Hot-Rolled Bands	9.90	....	9.85	8.75	10.15
Wire Rods, Thomas Commercial No. 5	6.40	....	6.40	6.25	6.60
Wire Rods, O. H.	6.90	....	6.90	6.75	7.10
Bright Common Wire Nails (§)	9.00	....	9.05	8.95	9.35

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. §Per 100-kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene one deg (deld. east of Rockies).	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max), 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lots 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c; 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

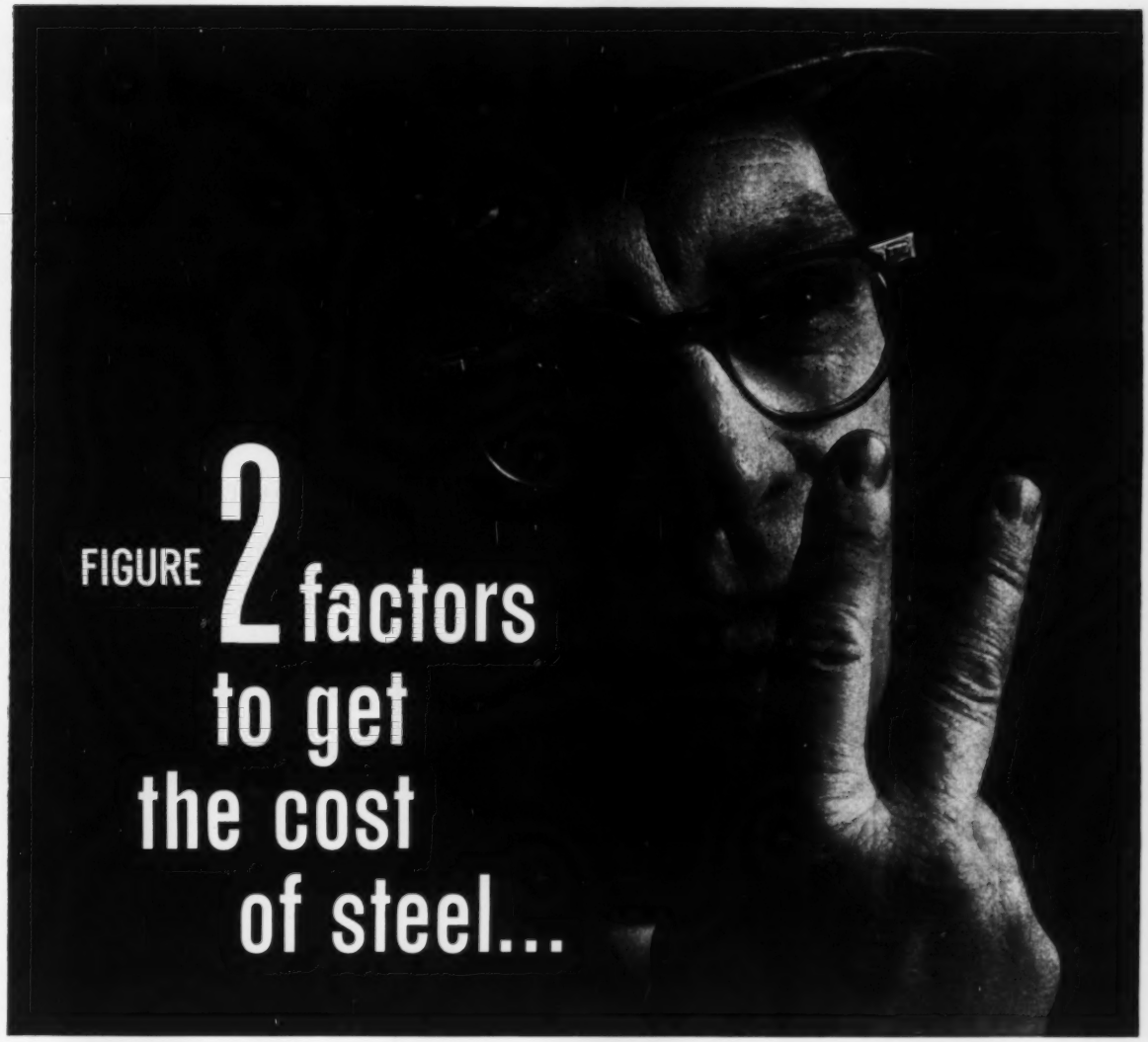
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



COST OF POSSESSION is an important addition to price!

What are the costs of possession when you put steel in inventory? Many are hidden. Run your eye down the chart at the right . . . it will help you find them.

Many smart, well-informed steel users find they save money by using the stocks, facilities and technical knowledge of their Steel Service Centers. They deliver steel when you want it, cut to exact size, ready for use. Your capital is freed for more profitable use.

Compare *all* of your costs, including *cost of possession*, with the price and *freedom from risk* of buying steel from your Steel Service Center. Get the booklet, *What's Your Real Cost of Possession for Steel?* from your nearby Steel Service Center. Or write to American Steel Warehouse Association, Inc., 540-G Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	_____
Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

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Scrap Eases as Buying Stalls

STEEL's index on heavy melting steel slips 50 cents a ton to $44.83. Mills fail to enter market on expected scale, despite zooming steelmaking operations

Scrap Prices, Page 128

● **Chicago**—A slow market is keeping scrap prices in check. About the only activity is the purchase of a single grade by a large mill—No. 1 industrial heavy melting at $46. It provides about the only available price peg. The mill will accept material only in limited volume from specified suppliers and is declining substantial tonnages from others.

● **Pittsburgh**—Failure of a leading consumer to purchase scrap this month has slowed the market's advance and deflated dealers' hopes. Only one mill is buying on a consistent, week to week basis, and it's taking small tonnages. Others seem intent on finding out how much hot metal they can get from their blast furnaces before committing themselves. The better grades remain in strong demand. Pennsylvania Railroad got $51 for its No. 1 heavy melting, $60.50 for wheels, and $68.30 to $69.40 for rail crops.

● **Philadelphia** — Supplies are increasingly tight here. A stiffening in domestic demand and steady pressure for tonnage for export are reported. At the same time, industrial scrap supply still reflects the lag in manufacturing resulting from the shortage of finished steel.

The price of No. 1 heavy melting is unchanged, but advances have been registered on several other major grades. No. 2 heavy melting is now quoted at $40, delivered, No. 1 bundles and No. 1 busheling at $49, No. 2 bundles at $30, and electric furnace bundles at $50. Couplers, springs, and wheels are higher at $51. So is drop broken machinery at $55.

● **New York** — Brokers have advanced their buying prices $1 a ton on several grades. They are offering $38-$39 for No. 1 heavy melting, $34-$35 for No. 2 heavy melting, $38-$39 for No. 1 bundles, and $22-$23 for No. 2 bundles. Also, they will pay $11-$12 for machine shop turnings, $14-$15 for mixed borings and turnings, and $15-$16 for short shoveling turnings. They have advanced their prices on low phos structurals and plates $3 a ton to $39-$40.

● **Cleveland**—The reactivated steel mills are taking in tonnage on old orders, but they haven't yet shown much interest in making new buys. Mill inventories are substantial, but dealers anticipate heavy demand before long because of rapidly accelerating steelmaking operations and the possibility of an ore shortage early in the new year.

● **Detroit**—The market is slow as dealers wait to see what happens in the steel industry. The mills have plenty of scrap on hand and are taking what they need for stockpiles. Few of them figure on buying more until they're sure there'll be a settlement soon and that they'll need tonnage by the end of winter.

Latest action was the sale of 35 to 40 cars of bundles by Chrysler. The price was reported to be $47-$48. An Ohio broker was said to be one of the buyers. There's an open Canadian order for bundles and some foundry steel, but so far there are few takers. Prices range from $43 to $47.

● **Buffalo**—The local market took a sharp jump last week when a leading consumer paid $36 for No. 2 heavy melting steel and $29 for No. 2 bundles. The prices represent increases of $5 to $7 a ton over those last paid. They also mark the first mill scrap purchase here since before the steel strike.

No. 1 heavy melting has been advanced $6 to a range of $39-$40, though there have been no sales. The purchase of No. 2 material involved a limited tonnage.

● **Cincinnati**—Although prices continue to be strong, some of the edge has been taken off bullish broker sentiment. Reason: Mills have not entered the market in a big way. One consumer released shipments on tonnage bought earlier. It's now thought there won't be much buying until December.

● **St. Louis**—The market is quiet, and prices are unchanged. Dealers are not actively soliciting business at present price levels. The Missouri Pacific Railroad withdrew a large list last week (No. 1 railroad heavy melting and other items) when bids did not come up to expectations.

● **Birmingham**—Expected increases in scrap prices failed to materialize last week. The largest buyer of

(*Please turn to Page* 133)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Nov. 18, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 18	$44.83
Nov. 11	45.33
Oct. Avg.	44.00
Nov. 1958	41.42
Nov. 1954	33.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 dealer bundles	45.00-46.00
No. 2 bundles	34.00-35.00
No. 1 busheling	45.00-46.00
No. 1 factory bundles	55.00-56.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals:	
2 ft and under	51.00-52.00
3 ft and under	50.00-51.00
Heavy turnings	*38.00-39.00*
Punchings & plate scrap	56.00-57.00
Electric furnace bundles	54.00-55.00

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Stove plate	46.00-47.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	47.00-48.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00-52.00*
Rails, 2 ft and under	*67.00-68.00*
Rails, 18 in. and under	*68.00-69.00*
Random rails	*61.00-62.00*
Angles, splice bars	*61.00-62.00*
Railroad specialties	*61.00-62.00*
Rails, rerolling	*66.00-67.00*

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*45.00-46.00*
No. 1 hvy melt., dealer	*42.00-43.00*
No. 2 hvy melting	*39.00-40.00*
No. 1 factory bundles	49.00-50.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	29.00-30.00
No. 1 busheling, indus.	*45.00-46.00*
No. 1 busheling, dealer	42.00-43.00
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*27.00-28.00*
Cast iron borings	*27.00-28.00*
Cut structurals, 3 ft	*52.00-53.00*
Punchings & plate scrap	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	57.00-58.00
Stove plate	52.00-53.00
Unstripped motor blocks	*49.00-50.00*
Clean auto cast	*64.00-65.00*
Drop broken machinery	*64.00-65.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*
R.R. malleable	65.00-66.00
Rails, 2 ft and under	64.00-65.00
Rails, 18 in. and under	65.00-66.00
Angles, splice bars	57.00-58.00
Axles	*61.00-62.00*
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles, solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	31.00-32.00
No. 1 busheling	50.00-51.00
No. 1 bundles	47.00-48.00
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	51.00-52.00
Electric furnace bundles	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CLEVELAND

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	28.00-29.00
No. 1 factory bundles	46.00-47.00
No. 1 bundles	*44.00-45.00*
No. 2 bundles	26.00-27.00
No. 1 busheling	*47.00-48.00*
Machine shop turnings	*16.00-17.00*
Short shovel turnings	*22.00-23.00*
Mixed borings, turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Cut foundry steel	45.00-46.00
Cut structurals, plate 2 ft and under	51.00-52.00
Low phos. punchings & plate	*47.00-48.00*
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	*43.00-44.00*
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	58.00-59.00
Burnt cast	*47.00-48.00*
Drop broken machinery	58.00-59.00

Railroad Scrap

R.R. malleable	*68.00-69.00*
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Rails, random lengths	61.00-62.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	59.00-60.00
Angles, splice bars	59.00-60.00
Rails, rerolling	74.00-75.00

Stainless Steel
(Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00-40.00
No. 2 heavy melting	35.00-38.00
No. 1 bundles	46.50
No. 2 bundles	26.00
No. 1 busheling	46.50
Machine shop turnings	20.00
Short shovel turnings	20.00

Cast Iron Grades

No. 1 cupola	55.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00
Rails, 18 in. and under	56.00
Rails, random lengths	51.00
Rails, rerolling	65.00
Angles, splice bars	50.00

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	37.00-38.00
No. 2 bundles	25.00-26.00
No. 1 busheling	42.00-43.00
Cast iron borings	14.00-15.00
Machine shop turnings	25.00-26.00
Short shovel turnings	28.00-29.00
Bar crops and plate	*47.00-48.00*
Structurals & plates	46.00-47.00
Electric furnace bundles	42.00-43.00
Electric furnace:	
3 ft and under	41.00-42.00
2 ft and under	40.00-41.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	55.00-56.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00-43.00
Rails, 18 in. and under	56.00-57.00
Rails, rerolling	61.00-62.00
Rails, random lengths	*53.00-54.00*
Angles, splice bars	49.00-50.00

PHILADELPHIA

No. 1 heavy melting	45.00
No. 2 heavy melting	*40.00*
No. 1 bundles	*49.00*
No. 2 bundles	*30.00*
No. 1 busheling	*49.00*
Electric furnace bundles	*50.00*
Mixed borings, turnings	21.00-22.00†
Short shovel turnings	27.00
Machine shop turnings	24.00
Heavy turnings	35.00†
Structurals & plates	51.00-53.00
Couplers, springs, wheels	*51.00*
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grdes

No. 1 cupola	46.00-47.00
Heavy breakable cast	48.00
Drop broken machinery	*55.00*
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*22.00-23.00*
Machine shop turnings	*11.00-12.00*
Mixed borings, turnings	*14.00-15.00*
Short shovel turnings	*15.00-16.00*
Low phos. structurals & plates	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	35.00-36.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*39.00-40.00*
Short shovel turnings	*24.00-25.00*
Machine shop turnings	*20.00-21.00*
Cast iron borings	*22.00-23.00*
Low phos structurals and plate, 2 ft and under	*47.00-48.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	*49.00-50.00*
Rails, 3 ft and under	*55.00-56.00*
Railroad specialties	*47.00-48.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	55.00-56.00

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	37.00-38.00
No. 2 bundles	26.50-27.50

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	35.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	37.00-38.00
No. 1 busheling	37.00-38.00
Machine shop turnings	13.00-14.00
Short shovel turnings	15.00-16.00
No. 1 cast	39.00-40.00
Mixed cupola cast	38.00-39.00
No. 1 machinery cast	40.00-43.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*39.00-40.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	18.00-19.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	40.00-41.00
Heavy breakable	40.00-41.00
Unstripped motor blocks	32.00-33.00
Charging box cast	40.00-41.00
Clean auto cast	53.00-54.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00-33.00
No. 1 bundles	25.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*38.00*
No. 1 bundles	*39.00*
No. 2 bundles	22.00
Machine shop turnings	18.00
Shovel turnings	20.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*36.00*
No. 1 bundles	*36.00*
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	*44.00*

Cast Iron Grades

No. 1 cupola	*48.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Gradest

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

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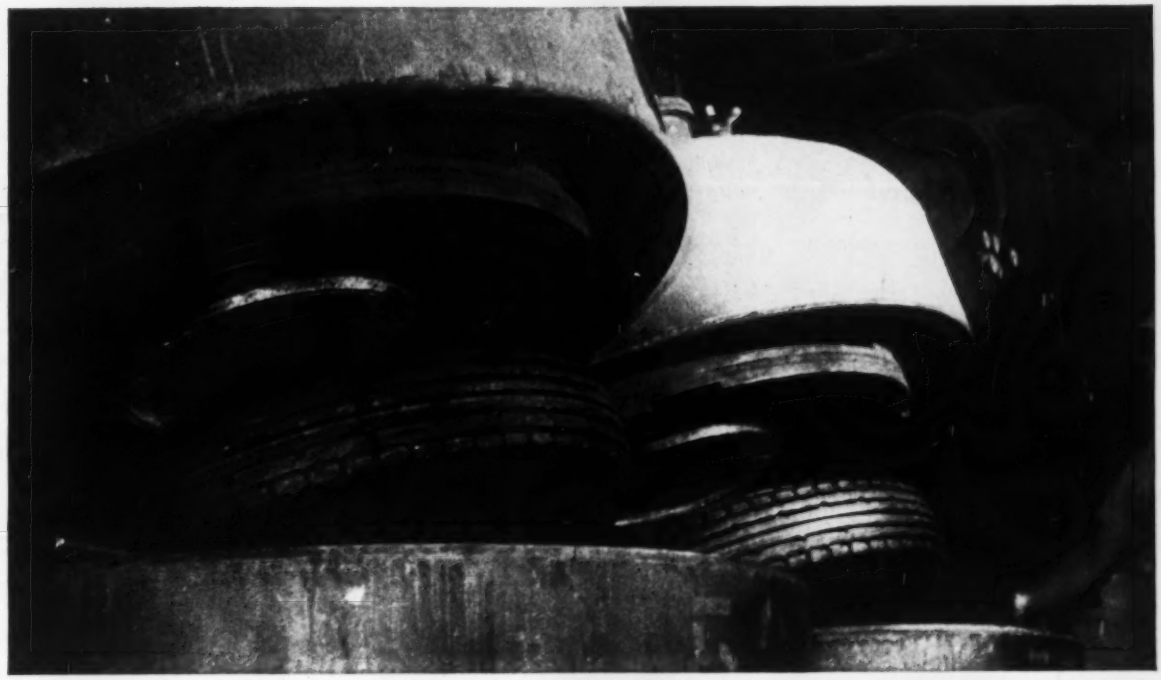

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STEEL
The Metalworking Weekly

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Copper Peace May Be Near

There's more activity than since the strike began. USW and Kennecott are said to be on the verge of a settlement. Most users have adequate supplies

Nonferrous Metal Prices, Pages 132 & 133

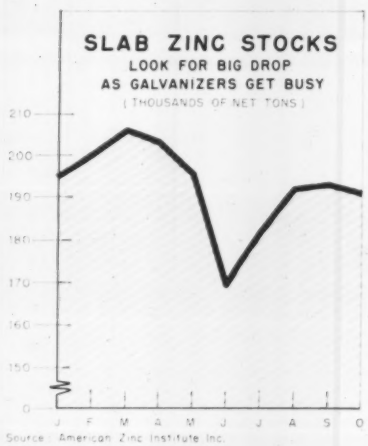
ODDS for at least a partial settlement of the copper strike look better than they have since the walkouts began over three months ago.

Point No. 1: Phelps Dodge Corp. signed a two year contract with the AFL-CIO Metal Trades Councils at its Arizona properties. It calls for a package increase of 15.7 cents an hour. The hitch is that idled facilities can't be started up until the company comes to terms with the other unions, and they've indicated the package is not enough. "Far under what we would accept," says one union official.

Point No. 2: As STEEL went to press, Kennecott Copper Corp. and the United Steelworkers of America were reportedly close to agreeing on a new pact. Both management and union teams meeting in Salt Lake City were keeping a tight lid on proceedings, but observers hinted Kennecott had made an offer "substantially better" than the 17.9 cent an hour package the steelworkers rejected earlier in the year. At least one participant looked for an early agreement and indicated that only one item has to be resolved: Contract language changes for work rules.

• **May Set Pattern**—If Kennecott settles with the USW, it's a safe bet the company will offer an identical package to the other big copper union, the International Union of Mine, Mill & Smelter Workers. The big question is whether the other copper producers would go along, even grudgingly, with a settlement in excess of 17.9 cents.

Some of the other producers indicated earlier this year they would balk at a settlement in the range supposedly now under discussion between Kennecott and the USW. Here's why: Kennecott, as an open pit miner, has lower costs than some of the other companies. Also, in underground mines, labor costs make up a bigger portion of total operating expenses. Further complicating matters: Some of the copper companies are also heavy producers of lead and zinc. They couldn't afford a major wage concession, they say, especially when contracts for much less have been signed with certain lead and zinc producers this year.



It remains to be seen whether one segment of the industry will be willing to stay out while the other is producing and selling copper. Historically, there's a precedent for different settlements within the industry.

• **Users Faring Well**—Users have fared surprisingly well since the walkouts began. STEEL surveyed 35 of the country's major copper consumers in five areas last week and found: Only a handful of companies have had to curtail operations for lack of copper. Most users bought heavily prior to the strike. Furthermore, many are operating at reduced levels because of a lack of steel, or because of fewer orders from their customers due to the steel strike (see Page 37).

Most user stocks are good enough to operate one to three months without taking in an additional pound of copper; some could last as long as six months. The majority of companies have been successful in picking up additional copper from primary producers, warehouses, and dealers. Hardest hit: Wire and cable manufacturers who have mostly had to curtail output due to a lack of wire bars. Some imported wire bars are still available.

• **Brass Mills** — Major brass mills say they have enough copper for uninterrupted operations for another six to eight weeks. They've been able to supplement stocks with foreign copper and scrap. Operations haven't been curtailed for a lack of copper, but there has been less demand due to the steel strike. At least one mill indicates a tightening in copper rods, sheets, certain types of tubes, and in bus bars.

Brass mill prices are up again. The change took into account added labor costs and other expenses, producers say.

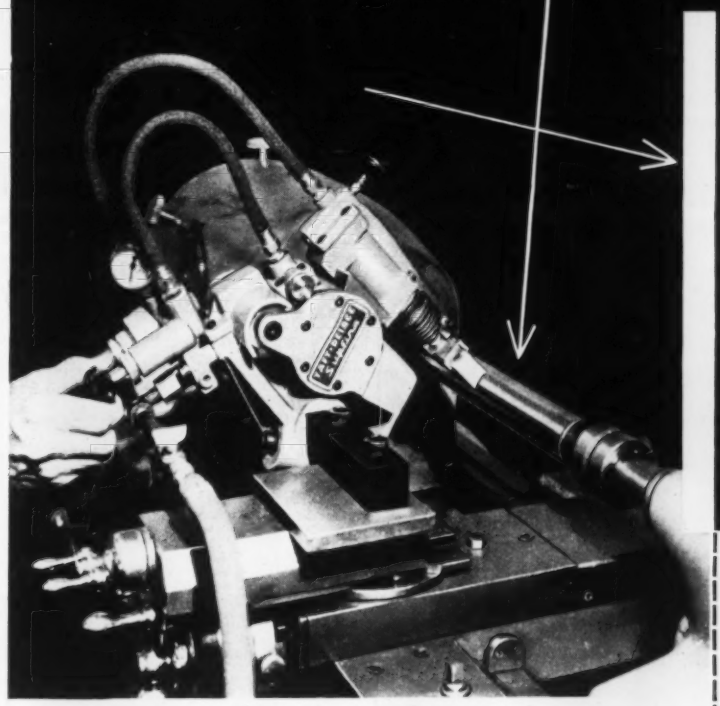
NONFERROUS PRICE RECORD

	Nov. 18 Price	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	33.00	Nov. 12, 1959	31.50	31.278	31.500	29.415
Lead	12.80	Aug. 24, 1959	11.80	12.800	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	101.125	Nov. 18, 1959	101.00	31.278	31.500	29.415
Zinc	12.50	Nov. 2, 1959	12.50–13.00	12.259	11.360	11.386

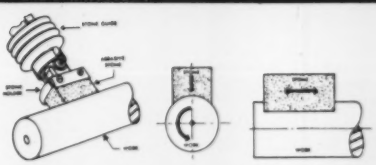
Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

THE NEW WORD IN METALWORKING IS MICROSTONING!

NOW! SIMPLIFIED, LOW-COST CORRECTION OF SURFACE GEOMETRY WITH TAFT-PEIRCE/SUPFINA MICROSTONING



This dramatic "before and after" evidence on a Talyrond chart shows how Microstoning corrected the surface geometry of a die set guide pin. The outside trace shows an average roundness of .00028" as ground. After Microstoning (inside trace), the roundness was improved to an average of .000030". Each scale division is .000020".



Microstoning with Taft-Peirce Supfina machine tool attachments produces a controlled microinch surface finish, removes cutting tool marks and grinding flats, and dramatically improves roundness.

The unique, patented Supfina design makes this precision surface correction possible. A free-floating piston, driven by compressed air oscillates an abrasive stone at high frequencies against the work — to achieve both desired finish and geometric correction in ONLY ONE OPERATION! All types of metals can be microstoned as well as hard plastics and other nonmetallic materials.

Try Microstoning on your product! Taft-Peirce/Supfina Attachments are low in cost and simple to operate. They can be used on lathes, boring mills, planers and other machines — to produce a precision surface and improve the performance of spindles, sealing rings, metal processing rolls, and bearing surfaces. Microstoning can be used on both flat and round surfaces. Contact your nearest Taft-Peirce Machine Tool Dealer for full information or write direct.

Here's what happens . . .

Microstoning is a low-pressure, low temperature abrading process using stones of various grit sizes. Stones are placed against the work with light pressure and vibrated from 1900 to 2500 times a minute as the workpiece rotates. The stones shape themselves to the mean radius of curvature, and more pressure is applied at high spots. This produces a fast and simplified correction of surface geometry that is demonstrated graphically by the Talyrond chart above.

Finish it with **TAFT-PEIRCE** *SUPFINA*

TP9-19

TAFT-PEIRCE MANUFACTURING CO., 25 MECHANIC AVENUE, WOONSOCKET, RHODE ISLAND

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.40 per lb deld.

Cobalt: 99+ %, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, nom.; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $215-217 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $22-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 101.125.

Titanium: Sponge, 99.3+ % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.00-3.80.

Zinc: Prime western, 12.50; brass special, 12.75; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 13.75; special high grade, 14.00 deld. Diecasting alloy ingot No. 3, 15.75; No. 2, 16.25; No. 5, 16.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.50; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.925, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.905, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lot, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.85
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length diam., 0.375-8 in., "F" temper; 2014 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheets and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.50-27.00; No. 2 heavy copper and wire, 24.00-24.50; light copper, 22.00-22.50; No. 1 composition red brass, 19.50-19.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 18.00-18.25; new brass clippings, 15.50-15.75; light brass, 12.00-12.25; heavy yellow brass, 13.50-13.75; new brass rod ends, 13.25-13.50; auto radiators, unsweated, 14.75-15.25; cocks and faucets, 15.00-15.50; brass pipe, 15.00-15.50.

Lead: Soft scrap lead, 8.50-9.00; battery plates, 4.25-4.50; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9.25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 3.75-4.00; old diecast scrap, 2.25-2.50.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 26.50; light copper 24.00; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 26.50; light copper, 24.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 16.50; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.40.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50, 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-20,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 19.75; flat tops, 19.75; flats, 22.50; ovals, 21.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.10; 100-600 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (Anhydrous): 25 lb, 154.40; 100 lb, 149.50; 400 lb, 147.10; 800-19,900 lb, 106.20; 20,000 lb or more, 100.10.

Stannous Sulphate: Less than 50 lb, 139.60; 50 lb, 109.60; 100-1900 lb, 107.60; 2000 lb or more, 105.60.

Zince Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 127*)

open hearth material had filled much of his needs during the shutdown, and the nominal amount of scrap purchased was at prices below what some brokers had paid on speculation.

• **Houston**—Export buyers have the local market to themselves. No competition for the available tonnage is expected from area mills until January.

• **San Francisco**—One small tonnage buy was made last week by the principal local mill at $40 a ton, $4 above previously quoted prices. It equals the price exporters have been paying for No. 1 heavy melting. Other mills are holding off purchases, reportedly negotiating for tonnage at a price range of $38-$40.

• **Seattle**—Mills hold fair inventories of scrap. They had been making limited purchases throughout the strike. Dealers' yards are shipping in greater volume, and the trade is bullish, expecting higher prices.

Japanese steel interests are reported negotiating for their January-March requirements.

• **Los Angeles**—With scrap flowing to the mills, the delivered price on No. 1 heavy melting is $42.50-$43, with brokers buying at $40.

Deepening of Channels Aids Lake Shipping

Shippers are already benefiting from the deepening of Great Lakes connecting channels, says Vice Adm. Lyndon Spencer, president, Lake Carriers Association, Cleveland. At present drafts, four more feet of water are available to upbound vessels between Lake Erie and Lake Huron.

The recommended draft for upbound ships in the Detroit River is 23 ft 5 in. (vs. 19 ft. 5 in. formerly). The same draft (23 ft 5in.) also applies to Lake St. Clair and the St. Clair River.

Improvement of the channels will be of greatest benefit to Great Lakes coal ships and foreign vessels bound for ports on Lake Huron or Lake Michigan. Some coal carriers are expected to be able to take full ad-

TECHNICAL SALES

Technical sales position with large metal company in the heat and corrosion resistant alloy field. Engineering degree preferred. Opportunity includes thorough mill training program. Submit resume with application.

Box 799, STEEL
Penton Bldg., Cleveland 13, Ohio.

SPECIFICATIONS WRITER

BUTLER MANUFACTURING COMPANY, MULTIPLANT WORLD LEADER in manufacture and sales of a broad line of pre-engineered buildings and other durable capital equipment is seeking capable Specifications Writer to prepare material specifications for metals, plastics and components used in the manufacture of pre-engineered buildings. Employment in headquarters Engineering Department of Buildings Division.

College training in Chemical, Mechanical or Civil Engineering preferred. Experience in and familiarity with ASTM and Commercial Standards and Federal Specifications desirable. Considerable knowledge of metallurgy and metals needed.

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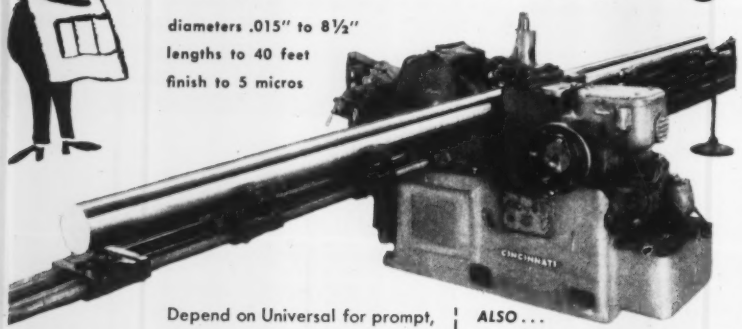

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Vessels bound for Lake Superior destinations will enjoy no advantage now since their limiting loading factor is the upbound draft (18 ft 9 in.) in the St. Marys River.

The deepening of all connecting channels to 27 ft. is scheduled to be completed in the mid 1960s.

Pig Iron . . .

Pig Iron Prices, Page 122

Pig iron production is increasing sharply. Mills are relighting blast furnaces as rapidly as possible and are approaching prestrike production levels.

U. S. Steel Corp. is operating nine blast furnaces at each of its Gary, Ind., and South Chicago, Ill., plants compared with ten each when the strike started. Another stack may start production shortly. American Steel & Wire Div. is operating two furnaces at Cleveland.

Inland Steel Co. has reactivated seven of its eight furnaces at Indiana Harbor, Ind. No. 5 furnace will be relined before resuming.

Youngstown Sheet & Tube Co. is reactivating all three of its stacks at Indiana Harbor and the two of three at South Chicago that were producing before the strike.

Republic Steel Corp. put the wind back on its furnaces at South Chicago on Nov. 16 after making minor repairs. The firm is operating four of six at Cleveland.

Interlake Iron Corp. has resumed production at only one of its two stacks at South Chicago. Its "A" unit may be given some repairs before being relighted.

Sharon Steel Corp. has relighted its Mary furnace at Lowellville, Ohio, which has been idle for two years.

Similar production gains are reported in other pig iron production centers across the country.

Foundries are using a high ratio of cast scrap in their melts, taking some pressure off the merchant iron market.

Prices on foreign pig iron are stiffening, although on an average they are still $5 to $6 a ton under the domestic market. October arrivals, all from Spain, at the port of Philadelphia totaled 9077 tons.

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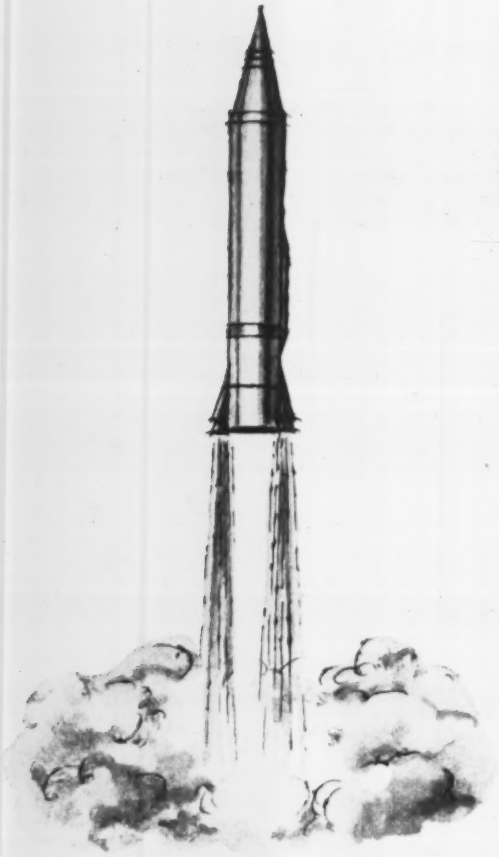
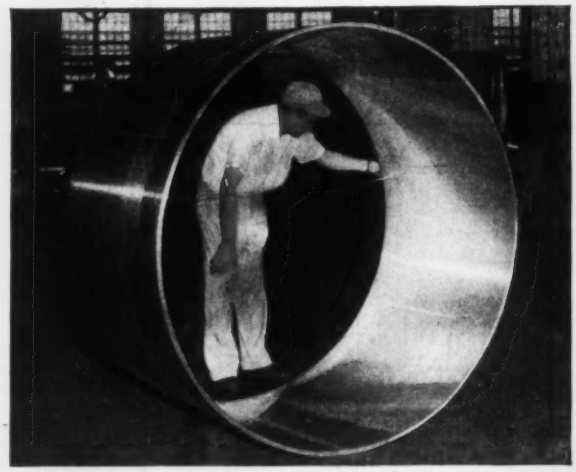
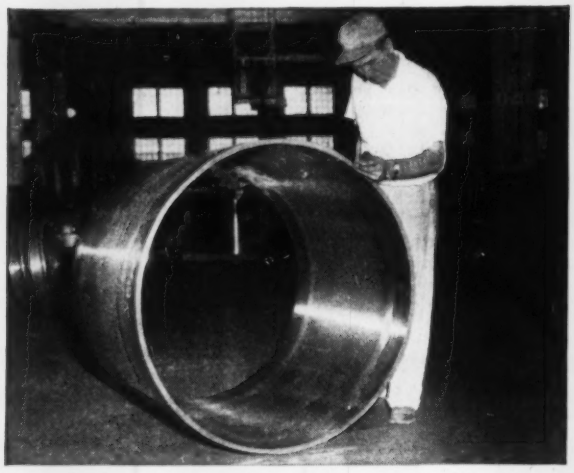




First stage motor case ring—vacuum-melted D6A steel



Second stage motor case ring—vacuum-melted 300M steel

Third stage motor case ring—air-melted AMS-256 steel

QUALITY OF "MINUTEMAN" MISSILES PARTS DETERMINED BY STANDARD STEEL WORKS RESEARCH

Months of research and development of various rigid quality-control procedures at Standard Steel Works Metallurgical Laboratories preceded the delivery of "Minuteman" missiles parts of extremely high-quality material.

Standard Steel Works' laboratory facilities—second to none in industry—make possible delivery of unusual forgings from special steel alloys in record time. Missiles parts of the highest cleanliness ratings have been furnished from both air and vacuum melted steel. All are subjected to ultrasonic inspection under water for defects and to microscopic examination for cleanliness.

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The casting above was Rotoblast cleaned at new low cost made possible by Rotoblast Steel Shot. Although cleaning cost per casting may seem a small part of your overall production cost, its efficiency often spells the difference between big and small profits on the finished job. Rotoblast assures you *maximum profit.*

Why? Because Rotoblast shot starts as a better-made steel, low in phosphorus and sulphur, produced in modern electric furnances. Because Rotoblast shot uses an exclusive casting method to produce solid shot. Because Rotoblast is continuous-heat treated in a controlled atmosphere—another exclusive—to give you uniformity and the right hardness for fast cleaning *and* long wear.

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STEEL SHOT AND GRIT

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